



**EUROPEAN COMMISSION**  
Directorate-General for Research and Innovation  
Research & Innovation Outreach  
Director



## **AMENDMENT Reference No AMD-730989-12**

### **Grant Agreement number: 730989 — International Development of gAnil-spirAL2 (IDEAAL)**

The parties agree to amend the Grant Agreement as follows ('**Amendment**')

#### **1. Change of Annex 1 (description of the action)**

**Annex 1** is changed and replaced by the Annex 1 attached to this Amendment.

#### **2. Change of the action's duration**

The duration of the action in **Article 3** is changed to 45 months.

#### **3. Change of the reporting periods**

The reporting periods are changed.

This implies the **following changes** to the Grant Agreement:

- The reporting periods in **Article 20.2** are replaced by:
  - RP1: from month 1 to month 18
  - RP2: from month 19 to month 45

All other provisions of the Grant Agreement and its Annexes remain unchanged.

This Amendment **enters into force** on the day of the last signature.

This Amendment **takes effect** on the date on which the amendment enters into force, except where a different date has been agreed by the parties (for one or more changes).

Please inform the other members of the consortium of the Amendment.

## SIGNATURES

For the coordinator

For the Commission

Enclosures:

Annex 1



**EUROPEAN COMMISSION**  
Directorate-General for Research and Innovation  
Research & Industrial Infrastructures



## **ANNEX 1 (part A)**

**Coordination and support action**

**NUMBER — 730989 — IDEAAL**

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# 1.1. The project summary

Project Number <sup>1</sup>	730989	Project Acronym <sup>2</sup>	IDEAAL
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**One form per project**

**General information**

Project title <sup>3</sup>	International Development of gAnil-spirAL2
Starting date <sup>4</sup>	01/01/2017
Duration in months <sup>5</sup>	45
Call (part) identifier <sup>6</sup>	H2020-INFRADEV-2016-1
Topic	INFRADEV-03-2016-2017 Individual support to ESFRI and other world-class research infrastructures
Fixed EC Keywords	Knowledge infrastructure
Free keywords	Nuclear physics, interdisciplinary research, international infrastructure

**Abstract <sup>7</sup>**

The objectives of the IDEAAL Project are to explore all possibilities to develop GANIL infrastructure, with its new ESFRI SPIRAL2 facility, in order to ensure its long-term sustainability as one of the premiere European research institutes for nuclear physics, interdisciplinary sciences and related applications.

The first objective of the IDEAAL Project is to enlarge the present GANIL membership to include academic institutions and private funding partners. This enlargement goes hand-in-hand with a reinforcement of the involvement of the current institutional funders and academic users of GANIL-SPIRAL2 in the decision-making process and management of the facility.

The second objective of IDEAAL is to enhance the excellence of access to the infrastructure by optimizing support to the users, access policy, assessment on the cost of access to the facilities and to data, improvement of the performance capabilities as well as exchange and training of personnel with associated partners.

Innovation is the third objective of IDEAAL. With the new facility SPIRAL2, it is essential to encourage industrial users of the uniqueness of this new machine for their research and applications and to allow them to develop new experimental tools at the existing GANIL facilities. Access provision dedicated to industrial users will greatly enhance their experience and increase their interest and trust in GANIL-SPIRAL2. In parallel, new ideas and topics for technology transfer will be clearly identified. The increase of innovation potential of GANIL will also be evaluated.

These three objectives must be supported by a strong communication and outreach policy towards members and funding partners, users and the layman. This is the fourth objective of the project.

Fulfilling all of these four objectives will allow a well-organized, highly efficient and sustainable development of the current GANIL structure.

## 1.2. List of Beneficiaries

Project Number <sup>1</sup>	730989	Project Acronym <sup>2</sup>	IDEAAL
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### List of Beneficiaries

No	Name	Short name	Country	Project entry date <sup>8</sup>	Project exit date
1	GRAND ACCELERATEUR NATIONAL D'IONS LOURDS	GANIL	France		
2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	CNRS	France		
3	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	CEA	France		
4	GSI HELMHOLTZZENTRUM FUER SCHWERIONENFORSCHUNG GMBH	GSI	Germany		
5	THE HENRYK NIEWODNICZANSKI INSTITUTE OF NUCLEAR PHYSICS, POLISH ACADEMY OF SCIENCES	IFJ PAN	Poland		
6	NORMANDIE ENERGIES	Nucleopolis	France		

## 1.3. Workplan Tables - Detailed implementation

### 1.3.1. WT1 List of work packages

WP Number <sup>9</sup>	WP Title	Lead beneficiary <sup>10</sup>	Person-months <sup>11</sup>	Start month <sup>12</sup>	End month <sup>13</sup>
WP1	Management	1 - GANIL	0.10	1	45
WP2	International Coordination and New Partners	2 - CNRS	120.70	1	45
WP3	Excellence of Access to Infrastructure	1 - GANIL	73.10	1	45
WP4	Innovation and Industries	1 - GANIL	45.10	1	45
WP5	Communication and Outreach	1 - GANIL	89.10	1	45
<b>Total</b>			328.10		

### 1.3.2. WT2 list of deliverables

<b>Deliverable Number<sup>14</sup></b>	<b>Deliverable Title</b>	<b>WP number<sup>9</sup></b>	<b>Lead beneficiary</b>	<b>Type<sup>15</sup></b>	<b>Dissemination level<sup>16</sup></b>	<b>Due Date (in months)<sup>17</sup></b>
D1.1	Plan for dissemination and exploitation of results	WP1	1 - GANIL	Report	Public	6
D2.1	Draft collaboration agreements negotiated with academic partners	WP2	2 - CNRS	Report	Public	45
D2.2	Report on strategic and legal studies for private funding	WP2	2 - CNRS	Report	Public	45
D2.3	Procedure of evaluation of in-kind contributions and their monitoring	WP2	2 - CNRS	Report	Public	24
D2.4	Report on new organisation involving users	WP2	2 - CNRS	Report	Public	30
D3.1	Access policy rules for academic and industrial users of GANIL	WP3	1 - GANIL	Report	Public	45
D3.2	Definition of a new User Office	WP3	1 - GANIL	Other	Public	45
D3.3	Tool for operation costs modeling according to beam time and experiments scenarios	WP3	1 - GANIL	Other	Public	45
D3.4	Data Management Plan	WP3	1 - GANIL	Report	Public	45
D3.5	Report on the new organisation of GANIL	WP3	1 - GANIL	Report	Public	45
D3.6	Complete mobility agreement ready for signature	WP3	1 - GANIL	Report	Public	45
D4.1	Business plan for the industrial application activity at GANIL	WP4	1 - GANIL	Report	Public	45
D4.2	Report on the technology transfers developed in the framework of the project	WP4	1 - GANIL	Report	Public	45
D4.3	Report on the increase of innovation potential study	WP4	1 - GANIL	Report	Public	45
D5.1	Information tools for industrial users	WP5	1 - GANIL	Websites, patents filling, etc.	Public	24



<b>Deliverable Number<sup>14</sup></b>	<b>Deliverable Title</b>	<b>WP number<sup>9</sup></b>	<b>Lead beneficiary</b>	<b>Type<sup>15</sup></b>	<b>Dissemination level<sup>16</sup></b>	<b>Due Date (in months)<sup>17</sup></b>
D5.2	Report on annual international conferences for GANIL users	WP5	1 - GANIL	Report	Public	45
D5.3	New web site and newsletters for academic users	WP5	1 - GANIL	Websites, patents filling, etc.	Public	24
D5.4	Online and printed communication tools for dissemination of information to the general public	WP5	1 - GANIL	Websites, patents filling, etc.	Public	45
D5.5	Press kit and online contents for journalists	WP5	1 - GANIL	Websites, patents filling, etc.	Public	30

### 1.3.3. WT3 Work package descriptions

<b>Work package number</b> <sup>9</sup>	WP1	<b>Lead beneficiary</b> <sup>10</sup>	1 - GANIL
<b>Work package title</b>	Management		
<b>Start month</b>	1	<b>End month</b>	45

#### Objectives

The WP1 - Management consists of the effective consortium management. It will coordinate all technical, scientific, financial, administrative, contractual and legal activities of the IDEAAL Project. It will oversee issues concerning science and society, and all other issues related to the activities conducted within the project. An appropriate management framework linking together all the project components will be implemented with an experienced and diverse management team and with the dedicated staff having all of the necessary skills.

#### Description of work and role of partners

**WP1 - Management** [Months: 1-45]

**GANIL**

Leader: GANIL

Total person.months (EU/own): GANIL (0/18)

WP1 team will coordinate the actions, organise meetings/workshops, and handle administrative, legal, and financial matters in order to guarantee the Project goals and deliverables. These tasks will be:

Task 1 - Management

- Propose a framework in order to ensure consistency and efficiency in administration and financial management.
- Prepare the Grant and Consortium Agreements. The consortium agreement between all participants will settle questions arising from the assignment of Intellectual Property Rights (IPR).
- Organise meetings of the consortium.
- Represent the project.

Task 2 - Studies and reporting

- Coordinate the reporting work and report submissions.

Task 3 - Dissemination and Exploitation of results

- Create and maintain a web site dedicated to IDEAAL to disseminate and promote the knowledge derived from the various activities of IDEAAL within and beyond the consortium. This website will also be used for the internal communication.
- Write a plan for the dissemination and exploitation of results that will be updated regularly and completed at the end of the project.
- Write a report of completed and planned communication activities.

#### Participation per Partner

<b>Partner number and short name</b>	<b>WP1 effort</b>
1 - GANIL	0.10
<b>Total</b>	0.10

**List of deliverables**

<b>Deliverable Number<sup>14</sup></b>	<b>Deliverable Title</b>	<b>Lead beneficiary</b>	<b>Type<sup>15</sup></b>	<b>Dissemination level<sup>16</sup></b>	<b>Due Date (in months)<sup>17</sup></b>
D1.1	Plan for dissemination and exploitation of results	1 - GANIL	Report	Public	6

**Description of deliverables**

D1.1 Plan for dissemination and exploitation of results (M6)  
D1.1 : Plan for dissemination and exploitation of results [6]  
Plan for dissemination and exploitation of results

**Schedule of relevant Milestones**

<b>Milestone number<sup>18</sup></b>	<b>Milestone title</b>	<b>Lead beneficiary</b>	<b>Due Date (in months)</b>	<b>Means of verification</b>
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<b>Work package number</b> <sup>9</sup>	WP2	<b>Lead beneficiary</b> <sup>10</sup>	2 - CNRS
<b>Work package title</b>	International Coordination and New Partners		
<b>Start month</b>	1	<b>End month</b>	45

### Objectives

Starting from January 1st, 2016, the GIE GANIL legal status now allows associated scientific partnerships with national and international collaborating institutions. The WP2 – International Coordination and New Partners will use this new legal opportunity to enlarge the GANIL membership to include academic and/or private institutions. Looking for new partnerships will be based on longstanding collaborations of GANIL with numerous institutions worldwide. In particular, GANIL has been collaborating for decades with German institutions such as GSI where the ESFRI FAIR infrastructure is currently being built. The other priority countries are Poland, Italy, Romania, Belgium, and Sweden in Europe, India and U.S.A. abroad. Other collaborating countries will be approached in a second stage.

Enlargement of the GANIL membership goes hand-in-hand with strengthening the involvement of the present institutional funding partners, and through the addition of possible private sponsors and academic users of GANIL facilities in the governing infrastructure.

### Description of work and role of partners

#### **WP2 - International Coordination and New Partners** [Months: 1-45]

CNRS, GANIL, CEA, GSI, IFJ PAN

Leader: CNRS & CEA

Partners: GANIL, IFJ PAN, GSI

Total person.months (EU/own): CNRS (38,6/0), CEA (18/0), GANIL (0/28), IFJ PAN (24/14), GSI (40/6)

Task 1 – Enlargement of membership towards academics and involvement of institutional funders

Task leaders: CNRS, CEA

Involved partner: GANIL

The support of regional, national and international partners either for specific development projects and/or for the operating costs of the GANIL infrastructure will be strengthened through new bilateral partnerships. It will open new and sustainable possibilities for GANIL financial support.

The team in charge of Task 1 will:

1. Contact potential future partners and identify the proper contact level for the negotiations.
2. Organise the negotiation team on the GANIL side.
3. Compile information on future partners for the negotiations, such as past and current contributions, agreements and collaborations.
4. Benchmark partner situation and define economical model for each target country.
5. Organise preparatory meetings.
6. Propose the first draft of the bilateral agreement for each potential partner.
7. Organise the signature process, if possible during the time of the IDEAAAL project.

With each future partner, different contributions may be negotiated, focused on a scientific priority for investment as a scientific topic (e.g.: Super Heavy Elements, laser spectroscopy, reactions with rare-isotope beams, neutron-induced reactions) or large detectors (e.g.: ACTAR TPC, AGATA, PARIS, FAZIA, GASPARD). The support from ESIF will be explored for every partner.

In order to facilitate contacts with new partners, the Task 1 team will also ensure the active participation of GANIL to national and international related initiatives as national roadmaps for Research Infrastructures, NuPECC – Nuclear Physics European Collaboration Committee (<http://www.nupecc.org/>) or GSO – Group of Senior Officers on Global Research Infrastructures ([http://ec.europa.eu/research/infrastructures/index\\_en.cfm?pg=international\\_level](http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=international_level)).

In parallel to the actions in favour of expanding the GANIL membership, the Task 1 team will propose the creation of a “Euro-Group” of institutional funding partners of GANIL at local, national and international levels. The aim of this action is to increase the interest and involvement of these funders in the evolution of GANIL beyond direct funding. The Euro-Group could consist of representatives of funding agencies supporting GANIL operation and development as the French Ministry of Research, the French National Research Agency, the region of Normandy, the city of Caen, the

European Commission and adequate agencies in partner countries. The Euro-Group would be an observer of GANIL development. Its members would receive regular updates on GANIL progress and strategy. As a consequence, they would be able to better adapt their own funding plans to maximize their efficiency and their commitment with GANIL.

#### Task 2 - Private sponsors and banks

Task leader: CEA

Involved partners: GANIL, CNRS

Presently, GANIL has no private sponsors. The Task 2 team will explore the possibilities for private foundations and/or individuals to sponsor GANIL, taking the EUFORI Study report as a starting point.

Different actions may support the funding strategy of GANIL targeting particularly financial institutions and potential sponsors:

- Communication: how to explain in non-scientific language our activities in science and technology and most importantly all of their potential applications in energy and medicine.
- Lobbying: how to reach different authorities and private companies and what kind of campaigning can be done.
- Branding: how to change the name GANIL into a brand to promote the recognition of GANIL activities. Financial sponsors will benefit from this new brand image of GANIL.
- Sponsor club: how to start a club of international sponsors interested in the different applications and science linked to our activities. The idea is to get associated with other prestigious institutions that are geographically close to GANIL.

In parallel, the Task 2 team will study possibilities of support from banks as the European Investment Bank and the Council of Europe Development Bank. The Task 2 team will build upon the example of the ARCHADE facility that is presently under construction near GANIL. A major source of funding for this facility is through the Council of Europe Development Bank and several private banks.

Two analyses will be performed in parallel:

- A study for possible strategies to attract private funding for GANIL.
- A legal study to explore possibilities for GANIL to receive and manage private funding.

All of these tasks will require external law counsellors and consultants since GANIL does not have these competencies.

#### Task 3 – In-kind contributions

Task leader: GSI

Involved partners: GANIL, CEA, CNRS

In-kind contributions (e.g. personnel, equipment) are often a large part of partner contributions to research infrastructures. Therefore, the evaluation of in-kind contributions is a major point of negotiation with partners.

It is essential to define common rules to estimate and to monitor the in-kind contributions.

The Task 3 team will start to establish such rules working on the evaluation of in-kind contributions for the French-German collaboration for FAIR and SPIRAL2, for which a financial agreement was signed in 2015. The French-German agreement for in-kind contributions will form the basis of the negotiations with potential national and international partners of GANIL.

The task comprises the organisation of workshops with in-kind contributors and the teams from GANIL and GSI in the initial evaluation phase as well as the necessary support for the follow-up activities, including a definition of the technical milestones to be reached while carrying out the packages, being integrated in the overall project plans. The role of co-ordinators and committees will be outlined and described in the related documents.

#### Task 4 - Involvement of academic users– representatives of large collaborations in User Board

Task leader: IFJ PAN

Involved partners: GANIL, CEA, CNRS

This task is dedicated to users' involvement in the GANIL organisation and development.

Since the beginning of the operation of GANIL, its academic users have been organised primarily in "ad-hoc" international collaborations, which propose and perform experiments with support from local GANIL teams. Experiments proposed by these collaborations are selected according to scientific excellence and feasibility by a Programme Advisory Committee (PAC), which is an international expert panel. Following the PAC recommendations, the scheduling of experiments is collaboration exchanges with GANIL teams on scientific, technical, organisational and safety-security aspects.

In general, the information between GANIL management and these research teams is organised through direct exchange with collaboration coordinators; general communication to the community is diffused via conferences, workshops, e-mails, and web sites. It ranges from scientific strategy to practical information on infrastructure organisation and administration procedures.

For several years new, experimental programs are more often being organised in campaigns of measurements driven by strong international collaborations like ACTAR TPC, AGATA, PARIS, INDRA-FAZIA, LISE, or CIMAP. This tendency will be even more developed with the collaborations around SPIRAL2 detection systems, namely NFS, S3 and DESIR.

With the development of GANIL towards an international infrastructure, it is important to further involve users and collaborations in charge of the detection systems in its organisational structure. Users and collaborations have to take part in the GANIL evolution and governance structure.

The team in charge of Task 4 will study how to settle and formalise this involvement taking into account the existing organisational structure of GANIL and collaborations in charge of detection systems. The Task 4 team will take advantage of examples in other international infrastructure in order to enrich this study.

The process of the involvement of users in an organizational structure which will integrate the different groups and detector collaborations; will continuously improve the scientific program for GANIL-SPIRAL2, and will create the possibility to influence the management policy on the science being conducted. This will be done in a few steps:

1. Identification of all collaborations planning to carry out their research at GANIL-SPIRAL2:
    - a. collaborations gathered around detection systems which are mounted at GANIL permanently,
    - b. collaborations gathered around detections systems which are foreseen to be brought to GANIL for certain periods of time,
    - c. collaborations defined by scientific projects focused on certain areas of research.
  2. Organization of a kick-off meeting aimed at:
    - a. reviewing the research activities conducted by the identified collaborations,
    - b. discussing the organizational structure of a General GANIL-SPIRAL2 Collaboration which involves all of the identified collaborations.
  3. Creation of a data base which includes information on all collaborative research groups, their members and all of the equipment at GANIL-SPIRAL2.
  4. Creation of a discussion forum regarding all activities related to research at GANIL-SPIRAL2.
  5. Working out a structure of the General GANIL-SPIRAL2 Collaboration:
    - a. establishing committees related to the different areas of activities: scientific programs, equipment, infrastructure,
    - b. establishing a central body which coordinates the committees activities,
    - c. working out a system of elections to that central body,
    - d. working out a form of representation of the General GANIL-SPIRAL2 Collaboration in the GANIL management and its rights in decision making on GANIL-SPIRAL2 policy,
    - e. definition of the Terms of Reference for the committees of the GANIL-SPIRAL2 Collaboration.
  6. Organization of working meetings gathering the representatives of the General GANIL-SPIRAL2 Collaboration (members of the central body and the various committees)
- As a conclusion to this study, they will propose to the GANIL management and regulatory authorities an adequate user's organisation including new committees, their terms of reference and membership, decision processes and information exchange.

**Participation per Partner**

Partner number and short name	WP2 effort
1 - GANIL	0.10
2 - CNRS	38.60
3 - CEA	18.00
4 - GSI	40.00
5 - IFJ PAN	24.00
<b>Total</b>	<b>120.70</b>

### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D2.1	Draft collaboration agreements negotiated with academic partners	2 - CNRS	Report	Public	45
D2.2	Report on strategic and legal studies for private funding	2 - CNRS	Report	Public	45
D2.3	Procedure of evaluation of in-kind contributions and their monitoring	2 - CNRS	Report	Public	24
D2.4	Report on new organisation involving users	2 - CNRS	Report	Public	30

### Description of deliverables

D2.1 Draft agreements with academic partners (M45)  
D2.2 Report on strategic and legal studies for private funding (M45)  
D2.3 Procedure of evaluation of in-kind contributions and their monitoring (M24)  
D2.4 Report on new organisation involving users (M30)

D2.1 : Draft collaboration agreements negotiated with academic partners [45]  
Draft collaboration agreements negotiated with academic partners

D2.2 : Report on strategic and legal studies for private funding [45]  
Report on strategic and legal studies for private funding

D2.3 : Procedure of evaluation of in-kind contributions and their monitoring [24]  
Procedure of evaluation of in-kind contributions and their monitoring

D2.4 : Report on new organisation involving users [30]  
Report on new organisation involving users

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS1	Template of collaboration agreement with academic partners	2 - CNRS	6	Template of collaboration agreement with academic partners
MS2	Report on cash, in-kind and like-kind exchange contributions for target partners	2 - CNRS	18	Report on cash, in-kind and like-kind exchange contributions for target partners
MS3	Report of the already existing contributions from the partner laboratories	2 - CNRS	15	Report of the already existing contributions from the partner laboratories

**Schedule of relevant Milestones**

<b>Milestone number<sup>18</sup></b>	<b>Milestone title</b>	<b>Lead beneficiary</b>	<b>Due Date (in months)</b>	<b>Means of verification</b>
MS4	Kick-off meeting of the General GANIL-SPIRAL2 Collaboration	2 - CNRS	12	Kick-off meeting of the General GANIL-SPIRAL2 Collaboration
MS5	Database on research groups and equipments of GANIL-SPIRAL2	2 - CNRS	18	Database on research groups and equipments of GANIL-SPIRAL2



<b>Work package number</b> <sup>9</sup>	WP3	<b>Lead beneficiary</b> <sup>10</sup>	1 - GANIL
<b>Work package title</b>	Excellence of Access to Infrastructure		
<b>Start month</b>	1	<b>End month</b>	45

### Objectives

The objective of WP3 – Excellence of Access to Infrastructure is an important qualitative improvement of the user access organisation in order to ensure its constant excellence in the future.

In this aim, the access policies, organisation of logistical support and management of IPRs will be modified for the specific features of SPIRAL2. The costs for serving the users will be assessed for better informing the funding partners and users. A Data Management Plan will be proposed to improve the performance capabilities of GANIL. A personnel exchange and training programme will be drafted with the GANIL partners.

### Description of work and role of partners

#### **WP3 - Excellence of Access to Infrastructure** [Months: 1-45]

**GANIL, CNRS**

Leader: GANIL

Participant: CNRS

Task 1 – Definition of access policies for researchers, organization of the logistic support for researchers, and management of IPRs and ethical issues

Task leader: GANIL

The high-quality access to infrastructures is an essential part of GANIL policy. The whole facility was established and is operating as a user's infrastructure, with a relatively small local user's group and a strong logistical support for several outside users. During periods of operation, researchers require access to the experimental areas anytime (24 hours a day and 7 days a week) during the preparation and the realization of their experiments. The access to a nuclear physics infrastructure must also follow strict safety and security rules.

Therefore the precise definitions of access policies are crucial. These access policies have been defined for the existing GANIL facilities. They now need to be reviewed and updated for the SPIRAL2 facility taking into account the proposed international character of the facility.

In parallel, the organisation of the logistical support for researchers will be updated for the use of the new experimental halls. The local support teams will be reorganised in order to take into account these new halls and instrumentation. The beam time scheduling procedure and corresponding organisation will be improved. For outside users coming to GANIL for experiments, the current organization related to administration will evolve towards a new User Office with dedicated staff members. The Task 1 team will analyse examples of such user offices in other infrastructures and institutions before creating the GANIL User Office. This structure will provide all the necessary support to users for their stays that could range from one day to several months.

The management of Intellectual Property Rights will also be reconsidered and updated if necessary for each step of the experiment process: the proposal for experiment, its preparation and realisation, the data analysis and the communication of results.

The question of ethics will be addressed, although in a limited way as scientific activities at GANIL do not usually involve research on humans, animals, or collection of personal data. Ethical issues will then concern relations with third countries, environment, health, nuclear safety and security. A dedicated ethical code of conduct will be elaborated to be signed by concerned users.

Team in charge of Task 1 will fulfil these actions in collaboration with the Task 2.4 team (Involvement of users).

Task 2 – Assessment of the costs for serving the user

Task leader: GANIL

In order to precisely analyse the service provided by a research infrastructure, it is essential to assess the access costs and more generally the costs for serving the user.

Based on the experience of GANIL since 1983, the Task 2 team will estimate these costs for the new SPIRAL2 facility and experimental halls and different multi-user configurations of the entire GANIL facility.

The study should list among all cost items, those which should be eligible as operation costs, differentiate the basic operation costs from those which are related to experiments, and propose a model for sharing the costs according to the use of the beam time. An analysis of what exists in similar research infrastructures should be implemented. At last, the newly established procedure should allow determining the operation costs according to different assumptions of beam time delivery scenarios and used facilities.

A tool will be implemented to easily evaluate the use of the beam time according to the entry data.

The results of this study will be communicated to users and funding partners in order to highlight the necessary budget for each experiment. They will be extensively used in negotiations with potential national and international partners of GANIL.

### Task 3 – Data management

Task leader: GANIL

The first step for this task aims to achieve two goals : list and describe the types of data generated by the installation and perform an audit of current and future GANIL users for an evaluation of the amount of data that they plan to produce (short and long term) in their experiments and how they wish to access and use the datasets afterwards.

The audit aims to raise concrete data (volume, storage duration, etc.) and expectations about data uses and exploitation from questioned persons.

In a second step, the result of this evaluation will be compared to the actual capacity of GANIL and the possible evolution of his data storage infrastructure. Next, an assessment of the data storage needs (both short and long term) will be proposed for GANIL. In this step will be also initiated the data management and access policy ; depending on the wishes and demands expressed by the users during the audit, the main rules and direction for the DMP will be outlined and proposed.

In a last step a study will be performed in order to propose a few scenarios to answer questions about data exploitation regarding the policy proposed in previous step. Namely, should the data be stored at GANIL ? For how long and what are the resource needs ? Should the users/collaborations transfer their data to their laboratories ? Should they be able to access data from their laboratories ? How the data should be organised to cover the users needs ? How the access and ownership should be granted and managed in a long term sight ? How to assess and ensure the security of this data management ? The question about opening these data (open data movement, open data initiative) should be addressed in this step as well including the description, the metadata, and licenses.

Each scenario will be assessed , its feasibility and cost evaluated ; the best scenario will be chosen as a basis for the redaction of DMP.

With all the estimated and studied scopes, the needed inputs will be gathered to define precisely the data management policy ; finally the DMP will be written.

### Task 4 – How to improve efficiency: study of GANIL performance capabilities

Task leader: GANIL

In order to optimize the performance capabilities of GANIL, the project aims at the analysis of efficiency in terms of providing beam, realisation of experiments, project coordination, etc.

The first step will be to analyse existing technical and administrative organisation of GANIL, for instance access to the infrastructure for academic and industrial users or purchasing rules. In a second step, the Task 4 team will use the results of this analysis to propose improvements in order to increase the excellence of operational performance and to optimize use of resources.

In this aim, the Task 4 team will work with a group of experts from research infrastructures of similar size in order to exchange good practices. In parallel, a specialized consulting company will analyse the internal organisation of GANIL.

The study of GANIL performance capabilities will be communicated to the funding partners contributing to the elaboration of their middle and long-term policies towards operation and further development of GANIL facility.

### Task 5 – Organisation of personnel exchange and training

Task leader: GANIL

One of the most important aspects of research infrastructure is the management of human resources. Research infrastructures rely upon highly qualified personnel, continuously improving their knowledge and know-how.

The Task 5 team will collaborate with GANIL partners in order to evaluate the possible common tools and resources to develop short and long-term staff exchanges and mutual training. The goal of this action is to increase the professional

skills of GANIL staff and of partner personnel in order to benefit from the largest possible pool of experts for GANIL facilities and instrumentation. All personnel, from technicians to engineers who contribute to the operation of the facility, will be concerned by this mobility scheme.

The possibility to use already existing schemes, e.g in the framework of nuclear fusion activities, or to adapt them to the needs, will be studied. The legal aspects of the proposed mobility schemes will be triggered, in relationship with the labour code and the appropriate tax regulations. Once a scheme is defined, it is proposed to test it with two long-term staff-exchange schemes on the GANIL premises. A test period of 12 to 18 months is envisaged.

In parallel, the Task 5 team will explore the possibility to create a specific department (or departments) for scientists belonging to a partner and who will work regularly for long periods at GANIL.

The study will also include financial support options, such as the European actions MSCA-RISE or H2020 Widening actions. A specific budget allocation will also be included for mobility purposes, via the negotiations, in the next European framework programme, and will possibly be extended to all large research infrastructures.

By the end of the IDEEAL project, the Task 5 team will propose a draft of a mobility agreement for every potential partner of GANIL towards a network for personnel exchange and training within the community using GANIL. The results obtained in Task 5 will be extensively used in negotiations with potential national and international partners of GANIL.

#### Participation per Partner

Partner number and short name	WP3 effort
1 - GANIL	0.10
2 - CNRS	73.00
<b>Total</b>	73.10

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D3.1	Access policy rules for academic and industrial users of GANIL	1 - GANIL	Report	Public	45
D3.2	Definition of a new User Office	1 - GANIL	Other	Public	45
D3.3	Tool for operation costs modeling according to beam time and experiments scenarios	1 - GANIL	Other	Public	45
D3.4	Data Management Plan	1 - GANIL	Report	Public	45
D3.5	Report on the new organisation of GANIL	1 - GANIL	Report	Public	45
D3.6	Complete mobility agreement ready for signature	1 - GANIL	Report	Public	45

#### Description of deliverables

D3.1 Access policy rules for academic and industrial users of GANIL (M45)

D3.2 Definition of a new User Office (M45)  
D3.3 Tool for operation costs modeling according to beam time and experiments scenarios (M45)  
D3.4 Data Management Plan (M45)  
D3.5 Report on the new organisation of GANIL (M45)  
D3.6 Complete mobility agreement ready for signature (M45)

D3.1 : Access policy rules for academic and industrial users of GANIL [45]  
Access policy rules for academic and industrial users of GANIL

D3.2 : Definition of a new User Office [45]  
Definition of a new User Office

D3.3 : Tool for operation costs modeling according to beam time and experiments scenarios [45]  
Tool for operation costs modeling according to beam time and experiments scenarios

D3.4 : Data Management Plan [45]  
Data Management Plan

D3.5 : Report on the new organisation of GANIL [45]  
Report on the new organisation of GANIL

D3.6 : Complete mobility agreement ready for signature [45]  
Complete mobility agreement ready for signature

**Schedule of relevant Milestones**

<b>Milestone number<sup>18</sup></b>	<b>Milestone title</b>	<b>Lead beneficiary</b>	<b>Due Date (in months)</b>	<b>Means of verification</b>
MS6	Ethical code of conduct for users	1 - GANIL	18	Ethical code of conduct for users
MS7	Report on data management strategy	1 - GANIL	12	Report on data management strategy
MS8	Assessment of data storage needs at GANIL	1 - GANIL	24	Assessment of data storage needs at GANIL
MS9	Analysis of existing technical and administrative organisation	1 - GANIL	6	Analysis of existing technical and administrative organisation
MS10	First version of mobility agreement	1 - GANIL	24	First version of mobility agreement

<b>Work package number</b> <sup>9</sup>	WP4	<b>Lead beneficiary</b> <sup>10</sup>	1 - GANIL
<b>Work package title</b>	Innovation and Industries		
<b>Start month</b>	1	<b>End month</b>	45

### Objectives

The WP4 – Innovation and Industries will focus on actions towards industrial users and on actions on industrial valorisation and innovation.

These actions will be of general interest. Access dedicated for new applications to the existing GANIL accelerators and to the new SPIRAL2 facility, proposal on involvement of industrial users within the GANIL organisation, general support for industrial applications and technology transfer, and for the increase of innovation potential for GANIL.

Two specific topics will also be developed as they are subjects of dedicated R&D developments at GANIL: the technology and know-how transfer for beam profile monitors and the definition of a methodology for technology transfer for the production of radioisotopes. These will allow to test and improve the proposed organisational schemes.

### Description of work and role of partners

#### **WP4 - Innovation and Industries** [Months: 1-45]

GANIL, CEA, Nucleopolis

Leader: GANIL

Involved partners: Nucléopolis, CEA

Task 1 – Limited pilots of access provision to research teams from industries and involvement of industrial users

Task Leader: GANIL

#### Objectives

Limited pilots of access provision to GANIL and SPIRAL2 will be proposed to research teams for new applications, therefore exclusively for teams from industries. The goal is to convince the industries of the interest of the new accelerator SPIRAL2, for their measurements and applications, and to attract more industries for new applications through the use of the GANIL accelerators.

In parallel, the Task 1 team will discuss with major industrial users how to increase their involvement in the organisation of GANIL.

Provision of access to the following infrastructure(s): GANIL and SPIRAL2@GANIL

Name of the infrastructure: GANIL and Système de production d'Ions Radioactifs en Ligne de 2ème génération (SPIRAL2) au Grand Accélérateur National d'Ions Lourds

Location of the infrastructure: Caen, FRANCE

Web site address: <http://www.ganil-spiral2.eu/>

Annual operating costs: 8,000,000 € (without manpower), 22,300,000 € (including manpower)

#### Description of the infrastructure:

GANIL is one of the major nuclear-physics facilities in the world with SPIRAL2 selected on the ESFRI list.

We describe here GANIL and the SPIRAL2 facility that will be used in the framework of the IDEAAL project.

GANIL is an interdisciplinary large-scale facility for French and International communities dedicated to research delivering ion beams from Carbon to Uranium at energies from a few keV/A up to 95 MeV/A for light ions, and the fields of research range from radiotherapy to the physics of the atom and its nucleus, from condensed matter to astrophysics. These beams are also available under certain conditions for applied physics and industrial applications, like membrane production or space components irradiation.

SPIRAL 2 Phase 1 (to be operational from 2016): superconducting linear accelerator (SC LINAC) accelerating beams from protons to heavy-ions with  $A/Q=2$  in the energy range from 0.75 MeV/u to 20 MeV/u (up to 33 MeV for protons, up to 14.5 MeV/u for heavy ions).

The SC LINAC will deliver beams with the highest intensities in the world for this energy range (up to 5 mA for deuterons and up to 1 mA for heavy-ions).

The laboratory has access to the major computing centres of the CNRS (CC IN2P3 in Lyon) and the CEA.

Services currently offered by the infrastructure:

All stable and rare isotope beams and all experimental areas at GANIL are open to external users. Each area has both a technical and a scientific coordinator, who act as liaisons with the outside users. They provide assistance to the users with regards to setting up and performing their experiments.

GANIL presently provides around 5000 hours of beam time per year. This corresponds to 40-50 experiments on average. From 2017, SPIRAL2 will provide an additional 2500-3000 hours approximately of beam time per year for users.

Around 700 scientists come annually to the facility, with about 300 physicists from the EU (non-national) and associated countries. International users contribute actively to funding and construction of all major experimental devices and new halls of GANIL/SPIRAL2 with an overall budget exceeding 2 M€. Around ten teams from industries and European spatial agencies come regularly to GANIL and use about 10% of the total beam time each year.

The average number of scientific publications related to GANIL experiments is around 130 per year.

#### Description of work

##### Modality of access under this proposal:

At GANIL, the beam schedule is mainly decided according to the experiments for fundamental research selected as a function of their scientific merit, by an International Programme Advisory Committee (PAC). The beam time dedicated to industrial users is defined from this beam schedule. The beam schedule is finalized 3 months before the start of the next beam period. The duration of a user's stay can range between a few days for the short solid-state physics experiments to several weeks for long nuclear physics experiments or campaigns of experiments. The users have to follow a specific procedure for any experiment, after it has been included in the GANIL beam schedule. The spokespersons receive several documents which are used as a basis to define more precisely the conditions of the experiment: beam optics, beam quality, detection systems, list of targets, expected data-acquisition support, specific needs (cryogenics needs, use of explosive gases and other materials) and the corresponding safety, security and radioprotection requirements. Allocation of beam time implies that the users group will benefit from all the laboratory infrastructures and equipment during their stay. The unit cost is determined taking into account consumables, energy and maintenance costs necessary to provide heavy-ion beams during one hour. The outputs of the experiments are the experimental data stored on disks that the research teams take back to their home laboratories for analysis.

##### Support offered under this proposal:

Scientific and technical assistance is routinely provided to GANIL users, in the experimental halls where scientific and technical coordinators take part in the set-up of the experiments including the electronics and associated data-acquisition systems. The beam is tuned to the user's experimental setup by beam operators and liaison scientists. The facilities user support provides access to the computers and networks, to data-storage devices, to workshops, and to electronics laboratories.

GANIL users also benefit from the local logistical infrastructure: a guest house, cafeteria, library and a general store for materials, components, and supplies.

##### Outreach to new users:

Information about GANIL facilities (technical and scientific information, calls for proposals, European support) is available online: <http://pro.ganil-spiral2.eu/users-guide/ganil-users> and widely announced via extended email lists.

All workshops and conferences organised by GANIL are also widely advertised by email, and through information posted on the GANIL website.

For industrial applications, outreach is achieved via an active participation in the RADECS association that gathers companies and beam providers, and also through participation in related conferences. The GANIL and SPIRAL2 facilities deliver beams unique in Europe, in terms of ion beam energy and intensity (for both ion and neutron beams). The number of users will increase with the new facility SPIRAL2 Phase 1 by about 200, as it will provide an additional 2500-3000 hours of beam time per year to current and new users. All GANIL users are registered which allows for an easy monitoring of their number on an annual basis.

##### Review procedure under this proposal:

Today, when a company submits a written proposal to conduct an experiment at GANIL, the proposal is analysed by the GANIL innovation officer and GANIL management. The beam time is granted according to availability. A price quotation is sent to the company for their approval, 2 months before the experiment.

Task1 will finance the beam time for some industrial experiments, in particular new experiments that would like to test the capabilities of the GANIL facility, or to test some new experimental conditions, before confirming their interest in GANIL beams.

A dedicated international selection panel will be created to assess the proposed experiments.

A total of 240 beam hours over 36 months will be financed for the industrial users. The estimated unit cost corresponds to the price usually paid by industries to use GANIL beams.

#### Involvement of industrial partners in the GANIL organisation

In the framework of the IDEAAL project, a study will be performed with a selection of industrial users (among those using GANIL and SPIRAL2 facilities) on the possible involvement of these industries in the GANIL organisation. This study will include a proposal of a business plan for the industrial application activity at GANIL. The objective is to significantly increase the turnover of this activity at GANIL by the end of the IDEAAL Project.

#### Task 2 – Industrial Applications and Technology Transfer

Task Leader: Nucléopolis

Involved partner: GANIL

Today, GANIL is one of the four largest laboratories in the world for research using beams of ions. The construction of the SPIRAL2 facility constitutes a real technical and scientific advance for both France and Europe. GANIL will remain a leading facility for various fields of basic research in nuclear physics. Nevertheless an important place is reserved for industrial applications of the beams delivered by the facility. Very low-, low-, medium- or high-energy beams are available for various industrial users.

Beyond this main activity (beam production and fundamental and applied research), the operation and the continuous development of GANIL makes this equipment a kind of technology platform that can allow other types of interaction with industrial companies with the overall objective on industrial development. Indeed, to develop and run this facility, a very large field of technology is used at GANIL, most of them at the forefront of progress. Every type of collaboration is conceivable: expertise, collaborative research, licensing of patents or know-how... They can be seen in two domains:

The provision of technical and human resources - With the status of Nuclear Installation and with close operations of a production facility, GANIL can also be used under certain conditions (eg during a maintenance period) as support to outside companies for the development, testing and validation of their products, services or even for training (GANIL as a training site). For instance: development of tools for validation and radiation protection, and means of simulation. GANIL also has a large team of engineers and technicians with skills and even expertise in many areas relevant to industry: electronics, particle detectors, mechanics, vacuum technologies, command & control ... All of these persons might be included (for advice, expertise and technical assistance) in industrial projects, both for industrial development as well as for applied R & D.

In particular, the project has to analyse with ARCHADE (see task 2.4 for description of ARCHADE) to consolidate the interactions between GANIL and ARCHADE, especially on the industrial point of view and with the new "Normandy-Hadronthérapie" company. An industrial consortium constituted by the IBA group and highly committed French industrial partners, aims at developing, validating and manufacturing – in Caen – a new latest generation particle accelerator (for protons and carbon ions), the Cyclone®400 cyclotron.

Technology transfers - Continuous development of the accelerators, but also of the associated instrumentation (and especially the experimental equipment) leads to studies, design and manufacturing of technical means that could have other applications in many industrial sectors (aeronautics, chemistry, health, automotive ...). If these technology transfers are still underdeveloped, there is a large transfer potential which could be a major source of revenue for GANIL.

The objectives of Task 2 are to:

- Identify and map the industrial application potential of GANIL activities
- Define a general implementation method
- Launch the implementation of these industrial applications, particularly in two areas where this potential has already been identified:

o beam diagnostic system ("beam profile monitor")

o production of radioisotopes

##### Sub Task 2.1 : Provide industrial application tools to GANIL

Coordination: Nucléopolis

Objectives of Sub Task 2.1 are to:

- Realize the mappings of the existing potential:
  - o Transferable technologies
  - o Available skills and expertise
- Identify new areas for industrial applications ("market research")
- Identify companies by realizing a panel of "customers" in line with the base of GANIL suppliers but also with the directory of Nucléopolis members, with industrial and innovative companies in the region of Normandy and across Europe :
  - o Potential customers for the use of beams, equipment or research skills
  - o Candidates to transfer industrialization of devices from GANIL
- Build the implementation arrangements for transfers, for the production of radioisotopes or for the provision of resources (human and technical): financial and legal aspects, practical implementation...

- Build tools to promote this activity in connection with the communication service (cf. WP5)

#### Sub Task 2.2: Operational implementation – general case

Coordinator: Nucléopolis

This is to allow the "matching" between industrial application opportunities and the companies identified in Sub Task 2.1. Two modes are available :

- Organization of exchange meetings
  - o Organization of B2B meetings between GANIL internal stakeholders and companies identified in Sub Task 2.1
  - o Increase of the industrial component during the international "GANIL-SPIRAL2 Week" conference and GANIL conferences.
  - o Set up a virtual trading place on the website
- Participation in exhibitions: the first step is to identify reference fairs on the industrial areas identified in Sub-Task 2.2 (e.g. WNE event for nuclear energy), scientific symposia with an industrial exhibition dimension (e.g. RSNA in Radiology, EANM in nuclear medicine) or industrial days of Large Research Infrastructure ("France at CERN", ESS industrial days, ITER Business Forum)

#### Sub Task 2.3 : Operational implementation - Support for the technology transfer of the beam profile monitors

Coordinator: GANIL

GANIL has, for several years, been developing a type of beam diagnostic called a "Beam profile monitor", which is used to measure the beam dimensions. Up to now, GANIL has been producing itself the units necessary for its own needs and for the needs of other nuclear physics laboratories as well. For human resource reasons, and to increase technology transfer towards industry, the time has come for GANIL to transfer this expertise to a company, for the mass production of these beam monitors.

The technology and know-how transfer activity generally requires several studies concerning the legal aspects, the economical aspects and the marketing aspects. In particular on this precise subject, detailed studies of the various contracts need to be performed, as GANIL will continue the R&D activity on these beam monitors, in close collaboration with the company.

The project will allow supporting these different studies and writing of the final technology transfer and collaboration contracts.

#### SubTask 2.4 : Operational implementation - innovative radio-isotope production

Coordination: Nucléopolis

Radioisotopes are a new research topic at GANIL that will be tremendously enhanced with the new facility SPIRAL2. Radioisotopes, in general radiopharmaceuticals, are more and more essential for cancer treatments.

Indeed, chronic diseases such as cancer, brain and cardiovascular disorders constitute a societal burden. Conventional cancer treatments such as chemotherapy and hormone therapy are transiently effective, toxic and expensive. In such instances, radiopharmaceutical innovation holds great promise for diagnosis and therapy. Radiopharmaceuticals are drugs that contain radionuclides emitting ionizing radiation with imaging and/or cytotoxic properties.

In France, Normandy boasts an exceptional scientific, technological, medical and industrial environment in the field of nuclear science applied to health (medical imaging and radiotherapy), covering the entire value chain from fundamental research to clinical development. Caen, in Normandy, has chosen to improve knowledge about nuclear sciences and applications specifically in health. The "Plateau Nord", a research and innovation Science Park located in the vicinity of the GANIL and the CYCERON medical imaging platform combines internationally renowned skills in the field of radiobiology, radiopharmacy, radiochemistry, hadrontherapy, dosimetry, instrumentation, beam control, medical imaging, image analysis and radioprotection. In addition, a foundation project aimed at creating a European Hadrontherapy Resource Centre, ARCHADE, is built on the "Plateau Nord".

Since 2014, researchers from Caen (GANIL, LPC) and from Nantes (ARRONAX) have initiated a collaborative project aimed at studying the production of an innovative radioisotope: astatine-211. R&D on astatine-211 will be performed at the GANIL-SPIRAL2 facility.

In this context, the R&D program for innovative radioisotope production has been gaining the interest from the industrial side. The definition of a methodology for the technology transfer of this activity towards industry is thus very important and will be defined in the 2.1 sub-task. The project will then study with the radiopharmaceuticals industries the possibility to produce innovative radio-isotopes.

#### Task 3 - Increase of innovation potential

Task leader: GANIL

Involved partner: CEA



The objectives of this task are to study the possibilities of increasing the innovation potential of the GANIL laboratory. This thematic is becoming more and more important in the national and international context, and the GANIL facility can offer, through its specificities and its various scientific and technical developments, a lot of new application fields and innovations.

A systematic and detailed analysis will be performed, in order to identify:

- New applications with the use of heavy and light ion beams (GANIL and SPIRAL2 facilities) and new fast neutron beams produced by the SPIRAL2 facility. In the framework of the development of the accelerator technology to replace the reactor one, for as many applications as possible (international requirement, in particular by the International Atomic Energy Agency), many applications with accelerator beams have been identified, and the study will consist in evaluating the capability and added value of the GANIL facility for these new applications.
- New R&D activities in the expertise domains of the laboratory, potentially leading to innovative technology and innovative applications.
- The evolution of the facilities to be proposed, in terms of technical and organizational/operational changes, to lead to a substantial increase of beam time for industrial users, and to increase the R&D activity in the laboratory for more participation in innovation activities.

The study will describe all subjects identified, and will include the economical and commercial aspects related to the various items.

This detailed and complete study is proposed to be performed by specialists in valorisation of scientific activities, in particular persons from the CEA/DRF valorisation department. The persons will naturally have to work closely with the concerned scientific and technical experts of the laboratory, and GANIL management.

#### Participation per Partner

Partner number and short name	WP4 effort
1 - GANIL	0.10
3 - CEA	15.00
6 - Nucleopolis	30.00
<b>Total</b>	<b>45.10</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D4.1	Business plan for the industrial application activity at GANIL	1 - GANIL	Report	Public	45
D4.2	Report on the technology transfers developed in the framework of the project	1 - GANIL	Report	Public	45
D4.3	Report on the increase of innovation potential study	1 - GANIL	Report	Public	45

#### Description of deliverables

D4.1 Business plan for the industrial application activities at GANIL (M45)  
 D4.2 Report on the technology transfers developed in the framework of the project (M45)  
 D4.3 Report on the increase of innovation potential study (M45)  
 D4.1 : Business plan for the industrial application activity at GANIL [45]

Business plan for the industrial application activity at GANIL

D4.2 : Report on the technology transfers developed in the framework of the project [45]

Report on the technology transfers developed in the framework of the project

D4.3 : Report on the increase of innovation potential study [45]

Report on the increase of innovation potential study

#### Schedule of relevant Milestones

<b>Milestone number<sup>18</sup></b>	<b>Milestone title</b>	<b>Lead beneficiary</b>	<b>Due Date (in months)</b>	<b>Means of verification</b>
MS11	Beam profile monitors: Licence contract and R&D collaboration contract with the company	1 - GANIL	6	Beam profile monitors: Licence contract and R&D collaboration contract with the company
MS12	Report on the methodology for the technology transfer for radioisotope production	1 - GANIL	30	Report on the methodology for the technology transfer for radioisotope production

<b>Work package number</b> <sup>9</sup>	WP5	<b>Lead beneficiary</b> <sup>10</sup>	1 - GANIL
<b>Work package title</b>	Communication and Outreach		
<b>Start month</b>	1	<b>End month</b>	45

### Objectives

The WP5 – Communication and Outreach activities will strongly support WP2, WP3 and WP4 actions in order to optimize their effects. It will fulfil general objectives of an optimized communication of GANIL research topics, highlights and practical information to anyone professionally or personally interested by GANIL activities.

In this aim, specific communication actions will be developed towards users, members and funders of infrastructure, towards the layman and the media. Appropriate key messages will be formulated to each audience.

### Description of work and role of partners

#### **WP5 - Communication and Outreach** [Months: 1-45]

**GANIL, CNRS**

Leader: GANIL

Participant: CNRS

Task 1 – Towards members and funding partners

Task Leader: GANIL

It is essential to diffuse information towards members and funding partners in order to advise them about results obtained that could not be achieved without their financial support.

The existing communication towards members and funding partners will be enhanced through different actions:

- Preparation of dedicated communication tools will be implemented in connection with WP2 task 2 to find new private funders and sponsors.
- The GANIL communication service will work in collaboration with the communication services of regulatory authorities (CEA and CNRS), international partners and local authorities in order to use the communication tools already developed by each service (websites, newsletters...) and to coordinate the promotion of international joint projects.
- In this aim, a local communication network will be created in order to favour exchange of information between GANIL, the local funding partners and members and the public. This action will improve the communication particularly towards general public (see task 3).
- A summary activity report will be sent annually to members and funding partners to present the scientific and technical developments at GANIL.

Task 2 – Towards users (academics and industries)

Task leader: GANIL

Users need information about GANIL organisation in order to optimize the coordination of their experiments, and more generally, to ensure a high level of collaboration with GANIL teams.

Various tools will be developed to improve this information flux:

- Upgrade of the users web site, in order to optimize the search for information in preparation of experiments, meetings, and conferences. Results of partnerships between GANIL and national and international partners will be highlighted in a dedicated section.
- Creation of a GANIL newsletter for users for regular information about major GANIL events and common projects with its partners.
- An annual report of scientific and technical activities.
- An annual international conference focused on the GANIL community.

For industrial users, the Task 2 team will create specialized information and promotional tools such as leaflets and brochures. A dedicated web site will be set up to optimize the preparation of their experiments at GANIL and to provide all practical information (contacts, on-line maps, access conditions). In addition, GANIL will be advertised in specialized press. In this activity, it may be useful to use a firm specializing in marketing to help to define specific communication strategies for an industrial target and to define the specifications of communication tools. These actions will be built in close connection with Work Package 4.

Task 3 – Towards the layman

For a research infrastructure, communication to the general public is crucial for several reasons. One of them, concerning financial resources, is that public funds come from taxes. It is then a fair return to inform the public about the results produced from the use of these public funds. In addition, the general public is interested in science and its applications as evidenced by the growing popularity of the annual GANIL “Open House”. Finally, the communication actions towards the general public make people aware of the dynamic nature of the scientific community and to bring forward international joint projects.

With the start of SPIRAL2, special actions are necessary to communicate about this new infrastructure. The Task 3 team will organize:

- A travelling exhibition about GANIL, to be presented within GANIL and on the sites of its partners.
- Seminars of GANIL researchers during the French Science Festival and in partners’ countries.
- A virtual visit of GANIL to be available online to present the laboratory to local and foreign non-experts.
- Videos of GANIL, broadcasted on GANIL web TV and online platforms developed by partners.
- Brochures about GANIL (including teaching material, institutional and scientific information) as an introduction for visitors and provided to local, national and international partners.

More generally, the Task 3 team will propose a digital strategy for GANIL for the duration of the IDEAAL project and beyond. The digital strategy will explore and take into account all digital tools: social networks, videos platforms, websites and reciprocal exchanges of link strategies. These tools will be developed consistently with websites and editorial strategies.

In parallel, artistic partnerships will be implemented. The expected results are presentations of GANIL that will be complementary to what scientists usually do. The layman will then benefit from a different point of view on science in a research infrastructure.

#### Task 4 – Towards press

Developing as an international research infrastructure, GANIL needs to increase the communication actions towards press at a local, national and international level, with general and specialized press (industrial, scientific...).

Therefore, the Task 4 team will develop regular relationships with the press, instead of a case-by-case approach.

In addition, a press kit on GANIL will be created. It will summarize all general and institutional information about GANIL. A specific press area will be created on the GANIL web site to provide specific contents to journalists (press releases, copyright-free pictures, press contacts).

### Participation per Partner

Partner number and short name	WP5 effort
1 - GANIL	0.10
2 - CNRS	89.00
<b>Total</b>	89.10

### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D5.1	Information tools for industrial users	1 - GANIL	Websites, patents filling, etc.	Public	24
D5.2	Report on annual international conferences for GANIL users	1 - GANIL	Report	Public	45
D5.3	New web site and newsletters for academic users	1 - GANIL	Websites, patents filling, etc.	Public	24

### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D5.4	Online and printed communication tools for dissemination of information to the general public	1 - GANIL	Websites, patents filling, etc.	Public	45
D5.5	Press kit and online contents for journalists	1 - GANIL	Websites, patents filling, etc.	Public	30

### Description of deliverables

D5.1 Information tools for industrial users (M24)  
D5.2 Annual international conferences for GANIL users (M45)  
D5.3 New web site and newsletters for academic users (M24)  
D5.4 Online and printed communication tools for dissemination of information to the general public (M45)  
D5.5 Press kit and online contents for journalists (M30)

D5.1 : Information tools for industrial users [24]  
Information tools for industrial users

D5.2 : Report on annual international conferences for GANIL users [45]  
Report on annual international conferences for GANIL users

D5.3 : New web site and newsletters for academic users [24]  
New web site and newsletters for academic users

D5.4 : Online and printed communication tools for dissemination of information to the general public [45]  
Online and printed communication tools for dissemination of information to the general public

D5.5 : Press kit and online contents for journalists [30]  
Press kit and online contents for journalists

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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### 1.3.4. WT4 List of milestones

Milestone number <sup>18</sup>	Milestone title	WP number <sup>9</sup>	Lead beneficiary	Due Date (in months) <sup>17</sup>	Means of verification
MS1	Template of collaboration agreement with academic partners	WP2	2 - CNRS	6	Template of collaboration agreement with academic partners
MS2	Report on cash, in-kind and like-kind exchange contributions for target partners	WP2	2 - CNRS	18	Report on cash, in-kind and like-kind exchange contributions for target partners
MS3	Report of the already existing contributions from the partner laboratories	WP2	2 - CNRS	15	Report of the already existing contributions from the partner laboratories
MS4	Kick-off meeting of the General GANIL-SPIRAL2 Collaboration	WP2	2 - CNRS	12	Kick-off meeting of the General GANIL-SPIRAL2 Collaboration
MS5	Database on research groups and equipments of GANIL-SPIRAL2	WP2	2 - CNRS	18	Database on research groups and equipments of GANIL-SPIRAL2
MS6	Ethical code of conduct for users	WP3	1 - GANIL	18	Ethical code of conduct for users
MS7	Report on data management strategy	WP3	1 - GANIL	12	Report on data management strategy
MS8	Assessment of data storage needs at GANIL	WP3	1 - GANIL	24	Assessment of data storage needs at GANIL
MS9	Analysis of existing technical and administrative organisation	WP3	1 - GANIL	6	Analysis of existing technical and administrative organisation
MS10	First version of mobility agreement	WP3	1 - GANIL	24	First version of mobility agreement
MS11	Beam profile monitors: Licence contract and R&D collaboration contract with the company	WP4	1 - GANIL	6	Beam profile monitors: Licence contract and R&D collaboration contract with the company
MS12	Report on the methodology for the technology transfer for radioisotope production	WP4	1 - GANIL	30	Report on the methodology for the technology transfer for radioisotope production

### 1.3.5. WT5 Critical Implementation risks and mitigation actions

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
1	Financial	WP1, WP2, WP3, WP4, WP5	Planning and regular monitoring of spending by the coordinator and steering committee
2	Human	WP1, WP2, WP3, WP4, WP5	Identify a deputy to the work package leader
3	Human: lack of personnel per task	WP1, WP2, WP3, WP4, WP5	EU funding for personnel is supported where possible with realistic own contributions. Overall personnel is closely monitored within the WP and by each task leader.
4	Human: inability to find proper candidates for positions	WP1, WP2, WP3, WP4, WP5	The call for positions will be communicated as soon as possible and if necessary on an international level.
5	Non comprehensive view on the data of each partner	WP1	Creation of an IDEEAL web site + a biannual meeting with WP leaders.
6	Technical or legal issues slowing down negotiations with partners	WP2	Negotiations have to be prepared from the beginning of the project. Negotiations have to start as soon as possible.
7	Non necessity to improve the involvement of existing fruitful collaborations	WP2	A compact and rather detailed list of attractive propositions to each partner is helpful to gain on reliability ( "bottom up" approach)
8	Difficulty to create Euro-Group	WP2	Information to future members at the very beginning of the project.
9	Scheduling issue due to unavailability of users and difficulties to get interviews and answers	WP3	Contact users for interviews as soon as possible Recruit the DMP interviewer/writer as soon as possible
10	Process risk due to lack of responses from users	WP3	Foresee to contact enough users to have sufficient answers (half expected) Use online tools to contact users (Video, online meeting, web, etc)
11	Inadequacy of contracts for staff exchanges	WP3	Consult other European infrastructure to get existing models of contracts and exchanges schemes
12	Inadequacy on training schemes between different countries	WP3	Consult other European infrastructures to get existing models of training schemes
13	Difficulty to find users for access pilots	WP4	Advertise early and widely the new opportunity for experiments at SPIRAL2.
14	Technical risk on accelerator to deliver beam	WP4	Delay experiment in the second half and adapt the beam schedule.
15	Technology transfers: unexpected delay in the negotiations	WP4	Start the technology transfer at the very beginning of the project.
16	Difficulty to organise the travelling exhibition on partner premises	WP5	Inform the partners about this action already during the preparation of the exhibition in order to adapt its configuration.

1.3.6. WT6 Summary of project effort in person-months

	WP1	WP2	WP3	WP4	WP5	Total Person/Months per Participant
1 - GANIL	0.10	0.10	0.10	0.10	0.10	0.50
2 - CNRS	0	38.60	73	0	89	200.60
3 - CEA	0	18	0	15	0	33
4 - GSI	0	40	0	0	0	40
5 - IFJ PAN	0	24	0	0	0	24
6 - Nucleopolis	0	0	0	30	0	30
<b>Total Person/Months</b>	0.10	120.70	73.10	45.10	89.10	328.10



### 1.3.7. WT7 Tentative schedule of project reviews

<b>Review number <sup>19</sup></b>	<b>Tentative timing</b>	<b>Planned venue of review</b>	<b>Comments, if any</b>
RV1	21	tbc	mid-term review
RV2	36	tbc	final review

1.3.8. WT8 Summary of transnational / virtual access provision per installation

Access provider short name	Short name of infrastructure	Installation		Installation country code <sup>21</sup>	Type of access <sup>22</sup>	Unit of access	Unit cost (€)	Min. quantity of access to be provided	Access costs <sup>23</sup>		Estimated number of users	Estimated number of projects
		number <sup>20</sup>	Short name						On the basis of UC	As actual costs		
1 - GANIL	GANIL	1	GANIL	FR	TA-uc	Beam hour	936	240.0	224640		45	15

### **1. Project number**

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### **2. Project acronym**

Use the project acronym as given in the submitted proposal. It can generally not be changed. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### **3. Project title**

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

### **4. Starting date**

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a written justification.

### **5. Duration**

Insert the duration of the project in full months.

### **6. Call (part) identifier**

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

### **7. Abstract**

### **8. Project Entry Month**

The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

### **9. Work Package number**

Work package number: WP1, WP2, WP3, ..., WPn

### **10. Lead beneficiary**

This must be one of the beneficiaries in the grant (not a third party) - Number of the beneficiary leading the work in this work package

### **11. Person-months per work package**

The total number of person-months allocated to each work package.

### **12. Start month**

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

### **13. End month**

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

### **14. Deliverable number**

Deliverable numbers: D1 - Dn

### **15. Type**

Please indicate the type of the deliverable using one of the following codes:

R	Document, report
DEM	Demonstrator, pilot, prototype
DEC	Websites, patent filings, videos, etc.
OTHER	
ETHICS	Ethics requirement
ORDP	Open Research Data Pilot
DATA	data sets, microdata, etc.

## 16. Dissemination level

Please indicate the dissemination level using one of the following codes:

- PU Public
- CO Confidential, only for members of the consortium (including the Commission Services)
- EU-RES Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)
- EU-CON Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)
- EU-SEC Classified Information: SECRET UE (Commission Decision 2005/444/EC)

## 17. Delivery date for Deliverable

Month in which the deliverables will be available, month 1 marking the start date of the project, and all delivery dates being relative to this start date.

## 18. Milestone number

Milestone number: MS1, MS2, ..., MSn

## 19. Review number

Review number: RV1, RV2, ..., RVn

## 20. Installation Number

Number progressively the installations of a same infrastructure. An installation is a part of an infrastructure that could be used independently from the rest.

## 21. Installation country

Code of the country where the installation is located or IO if the access provider (the beneficiary or linked third party) is an international organization, an ERIC or a similar legal entity.

## 22. Type of access

- VA if virtual access,
- TA-uc if trans-national access with access costs declared on the basis of unit cost,
- TA-ac if trans-national access with access costs declared as actual costs, and
- TA-cb if trans-national access with access costs declared as a combination of actual costs and costs on the basis of unit cost.

## 23. Access costs

Cost of the access provided under the project. For virtual access fill only the second column. For trans-national access fill one of the two columns or both according to the way access costs are declared. Trans-national access costs on the basis of unit cost will result from the unit cost by the quantity of access to be provided.

**HORIZON 2020**  
**Call: H2020-INFRADEV-2016-1**  
**Topic: INFRADEV-03-2016-2017**  
**Type of action: RIA**

**International DEvelopment of gAnil-spirAL2**

Acronym: IDEAAL

Number: 730989

**History of changes – July 12<sup>th</sup>, 2019**

Part A	Modification of the project end date.
Part A	Modification of end date for WP1, WP2, WP3, WP4, and WP5.
Part A	Modification of delivery dates for deliverables D2.1, D2.2, D3.1, D3.2, D3.3, D3.4, D3.5, D3.6, D4.1, D4.2, D4.3, D5.2, D5.4.
Part B 3.1	Modification of the table of work packages and their components in order to reflect the modification of project end date
Part B 4.1	Removal of Ketel Turzó's CV and addition of Sabrina Lecerf's CV

**History of changes – April 16<sup>th</sup>, 2019**

Part A WP3	Addition of CNRS as partner and modification of effort
Part A WP4	Modification of effort for CEA
Part A WP5	Addition of CNRS as partner and modification of effort
Part A	Modification of budget: personnel costs of GANIL are transferred to CNRS and CEA
Part A	Modification of deliverables D3.2, D5.4 and D5.5
Part B 3.1	Modification of the table of work packages and their components in order to reflect the modification of deliverables
Part B table 3.4b	Total of other direct costs corrected in consistency with the amounts in Annex 2
Part B 4.1	Modification of GANIL description: removal of sentence on "Additional temporary workers to be hired"

**List of participants**

<b>Participant No *</b>	<b>Participant organisation name</b>	<b>Country</b>
1 (Coordinator)	Grand Accélérateur National d'Ions Lourds (GANIL)	France
2	Centre National de la Recherche Scientifique (CNRS)	France
3	Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA)	France
4	GSI Helmholtzzentrum fuer Schwerionenforschung GmbH (GSI)	Germany
5	The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN)	Poland
6	Nucleopolis	France

## 1. Excellence

### 1.1 Objectives

- *Specific objectives for the project*

The objectives of the IDEAAL Project are to explore all possibilities to develop GANIL (Grand Accélérateur National d'Ions Lourds) infrastructure, with its new SPIRAL2 facility, in order to ensure its long-term sustainability.

GANIL was funded in Caen, France in 1983 as an institute for fundamental research to investigate and consolidate knowledge about the atomic nucleus. The laboratory is operated jointly through its legal structure Groupement d'Intérêt Economique (GIE) by the National Institute of Nuclear and Particle Physics (IN2P3) belonging to the National Centre for Scientific Research (CNRS) and the Direction de la Recherche Fondamentale (DRF) of the Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA).

The quality of beams delivered by its accelerators and state-of-the-art scientific instruments make GANIL an outstanding multi-disciplinary facility. The range of areas explored with GANIL beams from studies of the atomic nucleus, the evolution of forces between nucleons, fundamental symmetries, nuclear astrophysics, radiobiology, and materials science (ageing of materials, hardness of electronic components carried into space and nuclear reactor vessels, for example).

With SPIRAL2, GANIL will produce the only ion beams of their kind in the world to support research from hadron and isotope therapy to the physics of the atom and its nucleus, from condensed matter to astrophysics. The study of the properties of nuclei forming these beams or their interactions with stable nuclei is a rapidly developing field of contemporary nuclear physics, astrophysics and interdisciplinary research. Novel research in nuclear physics at the limits of stability will be covered, including the study of the astrophysical  $r$  and  $rp$ -process nuclei, shell closure in the vicinity magic numbers as well as the investigation of very heavy elements. New addressed research areas are related to material sciences, radiobiology, research for hadron and isotope therapy, energy, environment, social sciences, health, engineering, space, ICT as well as inter and multi-disciplinary research in radiobiology.

GANIL is itself one of the five largest laboratories in the world dedicated to research with heavy-ion beams. Several hundreds of researchers, from all over the world, come to GANIL annually for experiments, seminars, or longer stays. GANIL is one of the premiere European heavy-ion beam research institutes and contributes to the radiance of European Science.

This constant strive for excellence has led the GANIL scientific community and technical teams to develop and build a new accelerator SPIRAL2. The SPIRAL2 facility, currently under installation and commissioning in its first phase, will extend the GANIL opportunities to heavier radioactive beams, and/or with much higher intensities. SPIRAL2 has been on the ESFRI roadmap since 2006.

Additional information on the GANIL/SPIRAL2 facility is available on our website: <http://www.ganil-spiral2.eu/>

The SPIRAL2 facility is located on the GANIL campus and is integrated in its organisation scheme and legal status. Since January 1<sup>st</sup>, 2016, the GANIL legal status allows associated scientific partnerships with national and international collaborating institutions.

The first objective of the IDEAAL Project is to capitalize on this new legal opportunity in order to expand the GANIL membership to academic institutions, industries and private sponsors. This development goes hand-in-hand with a reinforcement of the involvement of the current institutional funding partners and academic users of GANIL facilities in the decision-making processes of the infrastructure. The available resources to operate the facility and to construct the second phase of SPIRAL2, the heart of the whole project, are presently insufficient. With additional funds and personnel, which might be provided by new partners, we expect to fully achieve the scientific objectives of the SPIRAL2 project.

The second objective of IDEAAL is to enhance the excellence of access to the infrastructure on several aspects including support to the users, access policy, assessment on cost of access to facilities and to data, improvement of performance capabilities as well as exchange and training of personnel with associated partners.

Innovation is the third objective of IDEAAL. With the new facility SPIRAL2, it is essential to convince industrial users of the reliability of this new machine and to develop new experimental tools at the existing GANIL facilities. Access provision dedicated to industrial users will greatly help to increase their interest and trust in GANIL. In parallel, new topics for technology transfer will be clearly identified. The increase of innovation potential of GANIL will also be evaluated. These three objectives must be supported by a strong communication policy towards members and funders, users and the layman. This is the fourth objective of the Project.

Fulfilling these four objectives will allow a well-organized, highly efficient and sustainable development of the current GANIL structure, transforming existing collaborations into strong partnerships and creating new cooperation opportunities. As a consequence, IDEAAL will be the first step of the development of a true international research infrastructure GANIL, with a reinforced strategy for long-term sustainability.

## *1.2 Relation to the work programme*

The IDEAAL Project addresses the topic INFRADEV-03-2016-2017: “Individual support to ESFRI and other world-class research infrastructures” of the Work Programme 2016-2017 4. European Research Infrastructures (including e-Infrastructures).

The IDEAAL Project aims to support the implementation and long-term sustainability of the ESFRI infrastructure SPIRAL2, within GANIL, that will start operation in the coming few years for its Phase 1. SPIRAL2 brings a new dimension to its host infrastructure GANIL, requiring the development of stronger partnerships, the optimisation of access to the infrastructure, and the enhancement of innovation and outreach policies.



Being part of GANIL, SPIRAL2 shares its existing legal status that will be the basis to build a new consortium for GANIL, of scientific members, institutional funders and private sponsors, and to provide new possibilities to users, academics and industries, in terms of support, information and involvement in the infrastructure. The new and strong international consortium should allow for a sustainable operation of the facility and for the construction of the next phases of the SPIRAL2 project.

### *1.3 Concept and methodology, quality of the coordination and support measures*

- *Overall concept underpinning the project*

The user community of heavy ion-beam infrastructures for nuclear physics research is currently in a transition phase between current accelerators and next-generation facilities. SPIRAL2 at GANIL is one of the most important facilities of this new generation. Indeed, as mentioned in the ESFRI strategy report in 2016, prime examples of heavy-ion beam laboratories in Europe are JYFL in Jyväskylä (Finland), FAIR/GSI in Darmstadt (Germany), GANIL in Caen (France), ALTO at IPN Orsay (France), ISOLDE at CERN (Switzerland), and the INFN laboratories in Legnaro and Catania (Italy).

This crucial change of facility generation implies an evolution of the international dimension of GANIL and of its organisation for users. IDEAAL is meant to trigger and support this decisive change.

The top priority for IDEAAL is to explore all possibilities to ensure the long-term sustainability of GANIL:

- Enlarging the GANIL membership to national and international institutions;
- Involving funding partners, users (academics and industries), and private sponsors in the decision-making process;
- Optimizing the support for the users;
- Broadening exchanges with industry.
- Enhancing communication towards current and new partners;

- *National or international research and innovation activities which will be linked with the project*

GANIL is participating in numerous research and innovation activities at various levels.

In terms of innovation, at the regional level, GANIL is the founder of Normandie Incubation, a start-up incubator, since 2000 (<http://www.normandie-incubation.com/>). Today Normandie Incubation follows 50 start-ups working on very various topics from energy to health. Between 2013 and 2015, GANIL benefited from ESIF support through FEDER projects for two new major facilities S3 and DESIR connected to the new ion accelerator SPIRAL2.

For fundamental research and applications, the French ANR (Agence Nationale de la Recherche) has also supported these two facilities for more than 17 M€, through the EQUIPEX program and collaborative projects.

At the European level, GANIL and its owner CEA-CNRS are members of NuPECC (Nuclear Physics European Collaboration Committee), which is an expert committee of the European Science Foundation.

Several collaboration agreements are presently active at GANIL, especially as virtual laboratories called “Laboratoires Internationaux Associés” (International Associated Laboratories). Such agreements have been signed between GANIL and other French laboratories and partners in Poland, the Czech Republic, Italy, Romania, India, and Japan. These agreements last for four years from the first signatures and are regularly renewed.

More specifically, a crucial agreement between France and Germany was signed in 2015 for mutual funding, for several tens of M€, of two ESFRI infrastructures: SPIRAL2 in France and FAIR in Germany.

Most of the international partners are already participating in the construction of SPIRAL2 and associated instruments but they are not yet members of the GANIL legal structure and thus they are not contributing to the operation of facility.

GANIL is currently coordinating an Integrating Activity project, ENSAR2. In this project, different actions are precisely related to GANIL development:

- A Facility Coordination Group that consists of directors and chairpersons of experimental selection committees of infrastructures providing access within ENSAR2. GANIL is part of this committee that works towards a better synergy between research infrastructures for Nuclear Physics in Europe.
- The NuPIA work package is dedicated to innovation and will develop various tools for the improvement of innovation in research infrastructures. This will include a survey on innovation, creation of a European network of SMEs and industries, communication package, and training for employees of industrial companies.
- Transnational Access to GANIL for academic users.

These actions are complementary to the actions proposed in the present IDEAAL project.

In previous EU Grants, GANIL has already worked on its development with SPIRAL2. In the SPIRAL2 Preparatory Phase (2007-2012), international collaborations developing detectors and equipment for SPIRAL2 took shape and signed several collaboration agreements and Memoranda of Understanding. These collaborations continue to be extremely active today and will take part to specific actions of the IDEAAL project. In addition, the committee created during SPIRAL2 PP for the coordination of instrumentation, continues to coordinate and emphasize synergies between these different collaborations. Legal studies performed during the SPIRAL2 PP project concluded that the best legal framework for the development of GANIL would be an ERIC (European Research Infrastructure Consortium). To the best of our knowledge, this is presently not possible for a nuclear infrastructure.

GANIL participated in the FP7 CRISP project (2011-2014), a project for the implementation of ESFRI infrastructures in Physics. During this project, scientists developed equipment and detectors for SPIRAL2.

During FP7, GANIL coordinated and participated in various Marie Curie activities, individual fellowships and training network.

In parallel, GANIL coordinated the FP7 ENSAR project (2010-2014). This integrating activity was dedicated to existing infrastructures. During this project, SPIRAL2 was still at the beginning of its final design and construction. Therefore, the SPIRAL2 facility was not included in the scope of ENSAR activities.

GANIL participates also in a FP7 EURATOM project called CHANDA, through its new experimental hall NFS at SPIRAL2.

The ACTAR TPC detector is developed to be used with SPIRAL2, thanks to an ERC Starting Grant at GANIL.

- *Overall methodology*

The IDEAAL Project has a very solid basis with the existing GANIL facility, with an established GIE legal structure and numerous collaborations with international partners in Europe and beyond.

During the construction of the SPIRAL2 infrastructure, these collaborations were strengthened and new ones were created with new partners.

Work Package 2 of the IDEAAL Project on international coordination will use this foundation as a basis to deepen the collaborations and offer associated partnerships of GIE GANIL to countries already involved in SPIRAL2 construction and using existing GANIL infrastructure. New collaborations with industries and private sponsors will also be a priority of this strategic work package.

Excellence of access to the infrastructure will be the aim of Work Package 3 as it is crucial to optimize the support to users on technical and administrative aspects. A particular focus will also be on personnel dedicated to operating the facility as well as organisation of personnel exchanges and training with GANIL partners.

Work Package 4 will focus on relations with industries: how to convince industries to use the new SPIRAL2 infrastructure, how to enhance the knowledge transfer and to involve industrial partners in the funding scheme for new equipment, operating the facility and training (for example graduate student and PhD scholarships)

In order to increase the efficiency of Work Packages 2 through 4, Work Package 5 on communication and outreach will develop specific actions towards partners and users but also towards non-experts and the general public, which is a very important point for institutional funding.

Work Package 1 will not only deal with management of the consortium but it will also oversee the full integration of the various work packages of the Project. This latter point will be of primary importance for coordinating and supporting the project, in order to maximize the efficiency of each work package.

- *Sex and/or gender analysis in the project*

GANIL management and communities using its ion-beam facilities take sex and/or gender issues very seriously. GANIL will ensure that gender equality means giving equal consideration to the needs and interests of both women and men. Within the IDEAAL Project, it is and will be encouraged, whenever possible, for women to participate in the tasks and in the management structure. In particular, IDEAAL has women in responsible positions as deputy coordinator and majority of work package coordinators. It is anticipated that important effort will be done by GANIL, its funding agencies CEA and CNRS as well new partners to attract women to all existing and new management structures. Furthermore, the access to infrastructures and any other equipment or code is strictly the same for all genders, within the limits of radioprotection rules. All scientists have the same work and employment conditions.

## 2. Impact

### 2.1 *Expected impacts*

- *Contribution to the expected impacts*

As mentioned in the ESFRI roadmap 2010, “SPIRAL2 is a new European facility to be built at GANIL laboratory in Caen, France. The project aims at delivering stable and rare isotope beams with intensities not yet available with present machines. SPIRAL2 will reinforce the European leadership in the field of nuclear physics based on exotic nuclei.”

The IDEAAL Project will explore all possibilities to secure long-term sustainability of GANIL infrastructure. In this way, it will contribute to the first expected impact, providing Europe a sustainable Research Infrastructure and helping to respond to challenges in science, through fundamental and interdisciplinary research with heavy-ion and neutron beams, in industry, via technology transfer and the use of ion beams for industrial applications, and in society, with applied research for medicine.

With SPIRAL2, the leadership of the European Research Area in the global research environment will be strengthened through the uniqueness of the beams delivered by its accelerator, the state-of-the-art scientific equipment and high-quality staff. These specific features will attract numerous scientists and industries from outside Europe with an expected increase in the number of users by a factor of two.

Industrial applications using radioactive and stable ion beams began at GANIL in 1988 with the first experiments on microporous membrane production by irradiating polymer films with heavy ions, and the first tests of electronic components to study their behaviour and resistance under irradiation. After several years of testing, companies dealing with the aerospace industry have also developed programs of component certification with the use of GANIL beams. A new sample irradiation device funded by GANIL and CNES (with the support of OSEO), including detection and control system, has been fully operational since 2010.

As consequence, the period 2011-2015 has been very active in terms of contracts with industrial users, with an average of seven to nine experiments devoted to industrial applications performed every year, corresponding to an average of 300 beam hours.

With its scientific and technological expertise, GANIL acts as a relay enhancing the transfer of its employee skills to industrial companies and their applications. In this context, GANIL applies, in conjunction with the CEA and the CNRS, a policy of industrial property, which protects its knowledge and allows transfers of applied knowledge. In the domain of ECR ion sources, GANIL inventions are protected through four patents. Three of these have been licensed to the PANTECHNIK Company, which produces and sells ion sources worldwide: NANOGAN, MONOGAN, MULTIGAN and SHEGAN are registered trademarks. Moreover, a new collaboration research agreement was signed between PANTECHNIK and GANIL at the end of 2014, for the development and testing of a prototype design for a new multi-charged ion

source. First results are very promising and final tests are expected for the end of 2016, with a high probability of a new patent. Laboratory notebooks are used to ensure the respect of industrial property.

Several accelerator technologies developed at GANIL are potentially transferable to industrial companies, and a systematic analysis of all the possibilities will start in 2016. In 2015, the patenting of a new type of aluminium flange has been launched, and the transfer of know-how and industrialisation of beam diagnostics has been started, as well. IDEAAL in itself aims to enhance the collaboration between GANIL and its current and future institutional funding partners, i.e. the European Commission, the Member States, associated countries and relevant stakeholders as local authorities, in order to closely associate them to the development of GANIL as a genuine international infrastructure.

While developing partnerships with various international institutions through this Project, GANIL will further solidify itself as a leading representative of the European community using ion beams. In this way, the role of the European Union will be enhanced in all international organisations and multilateral forums in which GANIL will participate. In particular, we can mention the Group of Senior Officials (GSO) on Global Research Infrastructures established by the G8. GSO selected a list of infrastructures for all G8 countries. For France, only GANIL, with its new accelerator SPIRAL2, is on this list. The international development of GANIL will reinforce and update the European RI policy through a dissemination of the IDEAAL project results at the NuPECC and ESFRI committee meetings and conferences.

As described above, IDEAAL will provide a global dimension to the GANIL infrastructure. This will occur through an enlargement of the partnerships to the partners from outside Europe like China, India and USA and also through a new organisation of the infrastructure in order to support every user in any type of activity that he or she will perform with GANIL, on its site or remotely, for a short visit or a long stay.

GANIL will offer new opportunities to address societal challenges, especially through its new experimental hall dedicated to very intense light-ion and neutron beams. It will attract researchers from all over the world, as evidenced by the numerous letters of intent already addressed to GANIL from the international community. This attractiveness is also a great opportunity for researchers working at GANIL, especially on applied research as development of radioisotopes production methods, for cancer diagnostics and therapy, as described in Work Package 4.

One of the IDEAAL goals is to develop a programme of scientific, technical, administrative personnel exchange and training with the GANIL associated partners, in order to take advantage of knowledge and know-how developed in the various research institutions. Particular attention will be given to collaborations with less developed regions of European Union (in Poland, Romania, and Italy). In this way, GANIL and its partners benefit from each other to best train their staff. Consequently, IDEAAL addresses perfectly the expected impact on capacity building and Research Infrastructure human capital development in several European regions.

- *Barriers/obstacles, and framework conditions*

Today the European situation in terms of regulations and standards for the use of ion-beam infrastructures allows achieving scientific, technical, innovation and socio-economic impacts of research activities with this type of infrastructures as described in the previous section without any foreseen obstacles.

## 2.2 *Measures to maximise impact*

- *Dissemination and exploitation of results*
  - *Draft 'plan for the dissemination and exploitation of the project's results'.*

As Coordination and Support action, IDEAAL will not directly produce scientific results. The plan for dissemination and exploitation of IDEAAL's results will concentrate on the following actions:

- Towards national and international institutional funders (e.g. ministry, regulatory authorities, regional council, national research agency): preparatory documents for negotiations with partners, creation and diffusion of a summarized annual report, creation of a local network of communication officers.
- Towards users (academics and industry): renewal of the academic user web site, creation and diffusion of a newsletter for academic users, creation and diffusion of an annual activity report of the infrastructure, annual conferences dedicated to the user community, creation of a web site dedicated to industry, creation of leaflets presenting each facility and the opportunities for industry, purchase of advertising space in specialized press.

These dissemination actions will be performed in the work package 5 (communication) in close collaboration with specific bodies that will act in work package 2 (international coordination) and work package 4 (innovation):

- Communication services of CEA and CNRS
- A User Board, with representatives from among the user community
- Nucleopolis

These bodies will play a crucial role in distributing information towards (and from) the various partners. This organisation will optimize the exchanges between GANIL staff and its partners. It will also guarantee the sustainability of these dissemination actions beyond the duration of the Project.

In parallel to actions towards partners, the IDEAAL management group will ensure the internal dissemination through regular management meetings, a newsletter and a dedicated web site. The reports of the activities that will be produced for the EC will be placed on the IDEAAL website. Any news and highlights related to GANIL will be also displayed on the IDEAAL web site.

In addition, the progress of the IDEAAL project will be discussed monthly in management meetings at GANIL, in already existing GANIL coordination meetings of the “Comité de Laboratoire” (COLAB, three times per year), of the “Comité de Direction” (CODIR, twice per year), and of the Scientific Council (twice per year).

- *How the proposed measures will help to achieve the expected impact of the project.*

The expected impact of the IDEAAL project is to convince current and future partners of GANIL to invest in its operation and development through long-term commitments. Therefore, the dissemination measures are targeted towards users who come frequently to GANIL and can persuade their own institutions to become partners of GANIL, towards institutional funders who are the historical supporters of GANIL and towards private sponsors who are not yet participating in GANIL.

- *Proportion of the plan to the scale of the project, and measures to be implemented both during and after the end of the project.*

Objectives of the IDEAAL project are to explore all possibilities to ensure the long-term sustainability of GANIL. The Project is focused mainly on international aspects. Therefore, all of the dissemination measures, except those strictly foreseen for IDEAAL management, will be continued and developed after the end of the Project. The communication team will be reinforced during the project to set up all of the basic communication tools and launch an efficient communication network.

- *Business plan*

In the framework of the IDEAAL project, a business plan is relevant in particular for industrial application activities. This will be one of the deliverables of Work Package 4.

In addition, within Work Package 2, a report will be written on cash, in-kind and like-kind exchange contributions for target partners.

- *Pilot on Open Research Data*

The beneficiaries of the IDEAAL project will not directly generate research data from this project. Therefore the IDEAAL project will not take part in the pilot on Open Research Data.

- *Open source software used or developed by the Project.*



The IDEAAL Project will not use or develop open source software.

- *Strategy for knowledge management and protection*

IDEAAL Management will implement a consortium agreement at the start of the project in order to settle questions arising from the assignment of Intellectual Property Rights (IPR). IDEAAL partners will follow the 'green' model to provide free on-line access to the reports produced by the project in order to favour dissemination of IDEAAL results. These reports will not be published in reviews or journals. They will be free to access on the IDEAAL web site. In addition, Task 1 of WP3 will reconsider and update the management of IPRs at GANIL, if necessary, for each step of the experiment process: proposal for experiment, its preparation and realisation, data analysis and communication of results.

- *Communication activities*

- *Communication measures for promoting the project and its findings during the period of the grant*

As presented above, internal communication will be ensured by IDEAAL management meetings, a dedicated newsletter and website, and GANIL management and coordination meetings.

Communication towards partners (users, institutional funding partners, private sponsors) will be developed through various actions from websites to international conferences in order to maintain an intense information flux and, as a consequence, a high interest in GANIL.

Information and promotion of science and research infrastructures towards the general public are necessary to transmit the passion for science and explain the importance of research in society. There is a great interest within the public for new information about research infrastructures and how they help to reveal the mysteries of nature. Non-experts often have a negative view of nuclear physics due to its association with nuclear weapons and to problems associated with nuclear waste and nuclear energy. Nuclear science and its positive application aspects performed at GANIL will be emphasised, especially applications dedicated to health, and innovations resulting from research.

In order to promote and communicate about GANIL, many activities are planned during IDEAAL in order to reach a wide audience of students and non-experts.

Actions as foreseen in Work Package 5 include:

- Exhibition on the overview of the GANIL facility with posters presenting the infrastructure, an interactive model of the facility and its equipment. There will be a travelling exhibition to be displayed at GANIL and at the sites of our partners.
- Seminars for non-experts during the Science Festivals in France and in our partner countries.
- An online virtual visit of the infrastructure to be displayed on the GANIL web site.
- Social network analysis to define GANIL digital strategy.
- Artistic partnerships (e.g. artists in residence).

Communication towards the media is also crucial for an international facility such as GANIL. Therefore, the following actions are foreseen:

- Regular relationships with local and national press, and supply these contacts with regular information.
- Creation of a press kit for GANIL
- Creation of a specific press area on the website of GANIL

These tools will also be available for our partners to better communicate about their involvement in GANIL.

### **3. Implementation**

#### ***3.1 Work plan – Work packages and deliverables***

- *Brief presentation of the overall structure of the work plan*

The IDEAAL work plan is focused on enlarging the membership of the GANIL infrastructure, strengthening of involvement of users and funding partners and attraction of new users. These actions will boost the search of new durable sources of income for GANIL.

The work plan reflects this approach: development of implication of all persons participating in GANIL activities and evolution, improvement of quality of access to the infrastructure in the long term, and increase of innovation and industrial activities at GANIL. The communication and outreach activities aim to support each of these actions that will be developed during the IDEAAL project and continued long thereafter.

Deliverables and milestones indicate the major actions for each activity.

- *Timing of the different work packages and their components*

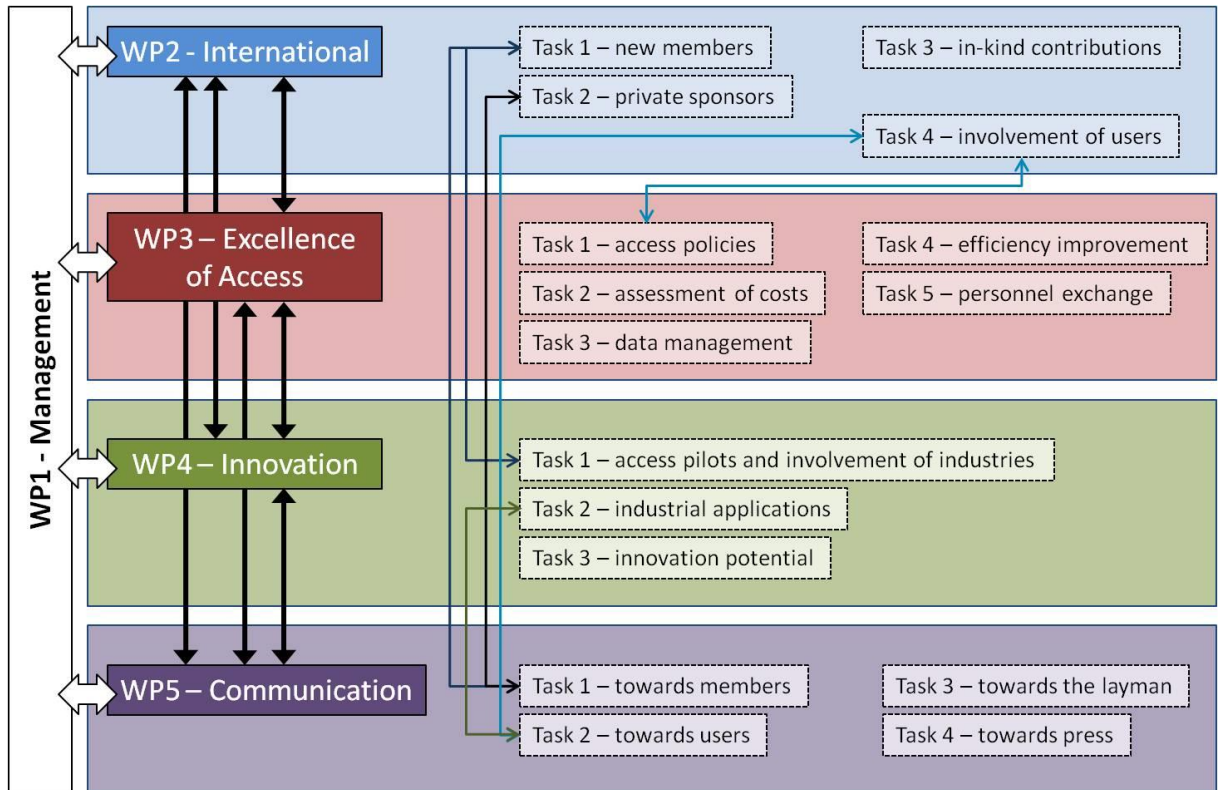
<b>Milestones</b>	<b>M</b>
<b>Deliverables</b>	<b>D</b>

	1 <sup>st</sup> year				2 <sup>nd</sup> year				3 <sup>rd</sup> year				4 <sup>th</sup> year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
<b>Work Package 1 - Management</b>															
<b>Task 1 -Management</b>															
<b>Task 2 -Studies and reporting</b>															
D1.1: Plan for dissemination and exploitation of results		<b>D</b>													
<b>Task 3 -Dissemination and Exploitation of results</b>															
<b>Work Package 2 - International Coordination and New Partners</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>
<b>Task 1 -Enlargement of membership towards academics and involvement of institutional funders</b>															
MS1: Template of collaboration agreement with academic partners		<b>M</b>													
MS2: Report on cash, in-kind and like-kind exchange contributions for target partners						<b>M</b>									
D2.1: Draft agreements with academic partners															<b>D</b>
<b>Task 2 -Private sponsors and banks</b>															
D2.2: Report on strategic and legal studies for private funding															<b>D</b>
<b>Task 3 -In-kind contributions</b>															
MS3: Report of the already existing contributions from the partner laboratories						<b>M</b>									
D2.3: Procedure of evaluation of in-kind contributions and their monitoring									<b>D</b>						
<b>Task 4 -Involvement of academic users– representatives of large collaborations in User Board</b>															
MS4: Kick-off meeting of the General GANIL-SPIRAL2 Collaboration				<b>M</b>											
MS5: Database on research groups and equipments of GANIL-SPIRAL2						<b>M</b>									
D2.4: Report on new organisation involving users										<b>D</b>					

<b>Work Package 3 -Excellence of Access to Infrastructure</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>
<b>Task 1 -Definition of access policies for researchers, organization of the logistic support for researchers, and management of IPRs and ethical issues</b>															
MS6: Ethical code of conduct for users						M									
D3.1: Access policy rules for academic and industrial users of GANIL															D
D3.2: Definition of a new User Office															D
<b>Task 2 -Assessment of the costs for serving the user</b>															
D3.3: Tool for operation costs modeling according to beam time and experiments scenarios															D
<b>Task 3 -Data management</b>															
MS7: Report on data management plan strategy				M											
MS8: Assessment of data storage needs at GANIL							M								
D3.4: Data Management Plan															D
<b>Task 4 -How to improve efficiency: study of GANIL performance capabilities</b>															
MS9: Analysis of existing technical and administrative organisation		M													
D3.5: Report on the new organisation of GANIL															D
<b>Task 5 -Organization of personnel exchange and training</b>															
MS10: First version of mobility agreement							M								
D3.6: Complete mobility agreement ready for signature															D
<b>Work Package 4 - Innovation and Industries</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>
<b>Task 1 - Limited pilots of access provision to research teams from industries and involvement of industrial users</b>															
MS11: Beam profile monitors: Licence contract and R&D collaboration contract with the company		M													
D4.1: Business plan for the industrial application activities at GANIL															D
<b>Task 2 - Industrial Applications and Technology Transfer</b>															
MS12: Report on the methodology for the technology transfer for radioisotope production										M					
D4.2: Report on the technology transfers developed in the framework of the project															D
<b>Task 3 - Increase of innovation potential</b>															
D4.3: Report on the increase of innovation potential study															D

<b>Work Package 5 -Communication and Outreach</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>
<b>Task 1 -Towards members and funding partners</b>															
D5.1: Information tools for industrial users								<b>D</b>							
<b>Task 2 -Towards users (academics and industries)</b>															
D5.2: Report on annual international conferences for GANIL users															<b>D</b>
D5.3: New web site and newsletters for academic users								<b>D</b>							
<b>Task 3-Towards the layman</b>															
D5.4: Online and printed communication tools for dissemination of information towards the layman															<b>D</b>
<b>Task 4-Towards press</b>															
D5.5: Press kit and online contents for journalists										<b>D</b>					

- *Graphical presentation of the components showing how they inter-relate*



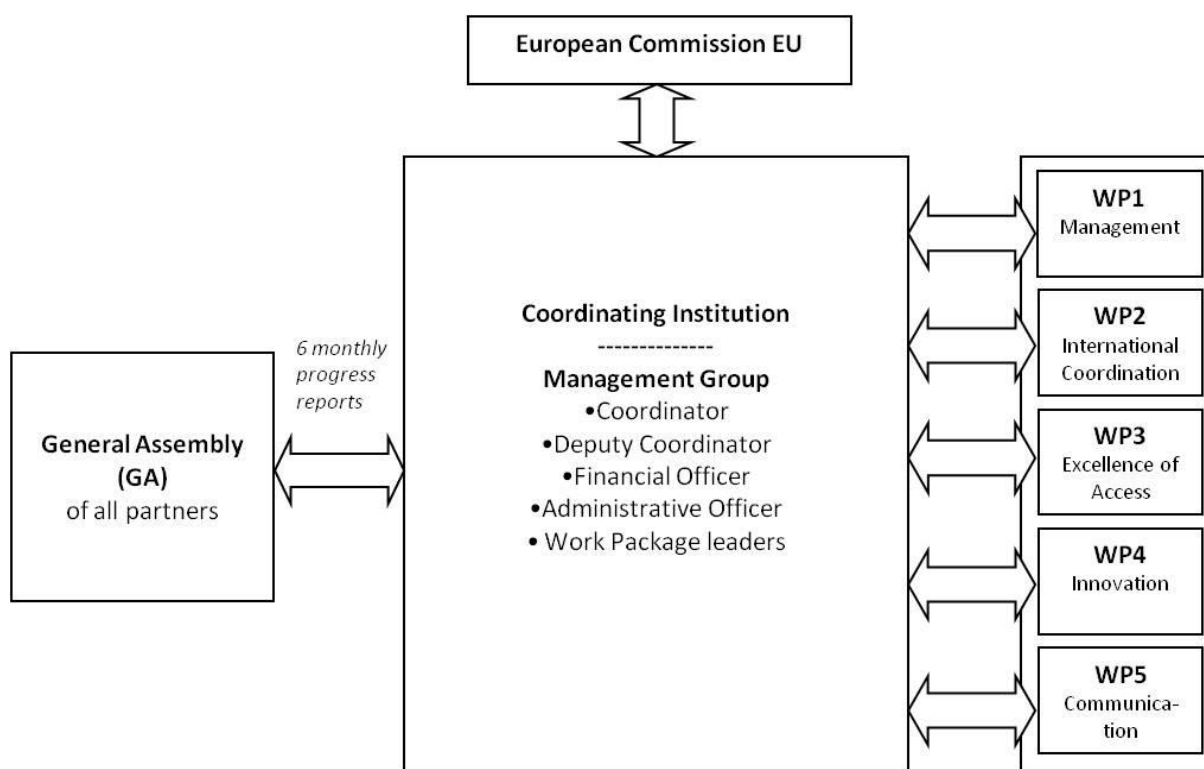
Legend: Bold arrows are for management and monitoring, thin arrows are for collaborations between work packages and tasks on specific topics.

### 3.2 *Management structure and procedures*

- *Organisational structure and decision-making*

#### **Coordination bodies**

The coordination scheme presented below describes the communication flow within the consortium, the distribution of rights and responsibilities, and contains the following elements:



- General Assembly (GA):** The general assembly consists of one representative of each participating laboratory/institution. The GA will insure the feedback to the community at large and monitor the overall progress of IDEAAL. The GA (each member having one vote) approves the working plan, matters relevant to the overall budget, changes in the structure of the project (including the involvement of new partners or the withdrawal of participants), changes in the consortium agreement, and final termination of the project. The GA will elect its chairperson in the first meeting.

Ordinary meetings are planned every six months. Extraordinary meetings can be called upon request of the coordinator, of 1/3 of the members or by any member in case of an emergency situation.
- Project Coordinator/Managing Institution:** The coordinator is the sole contact person with the European Commission; this person has the full responsibility for all scientific and administrative coordination of the entire project. The chosen coordinator will be assisted by the managing institution (GANIL) and is the head of the management group.
- Management Group:** To help the coordinator, the management group includes a deputy coordinator, a financial officer and an administrative assistant based at GANIL. GANIL will handle all financial transactions and accounting as well as all organisational matters related to the Project. The management group also includes



the Work Package Leaders for a close monitoring of work package progress. The Management Group will report to the General Assembly at each of its meetings.

- *Why the organisational structure and decision-making mechanisms are appropriate to the complexity and scale of the project*

The organisational structure and decision mechanisms of IDEAAL favour the involvement of all persons of the project through their corresponding decision body. With regular meetings and daily contact with the management group, an up-to-date overview of the project progress and a rapid decision-making process will be possible.

- *Innovation management in the management structure and work plan*

The innovation management will be performed through the dedicated work package 4 (Innovation and Industries) for the entire IDEAAL project. It was described in detail above and has as major actions: pilot access for industries, development of valorisation and innovation potential.

In WP4, GANIL will benefit from the expertise of Nucleopolis, an association for nuclear health and energy.

IDEAAL Management will implement a consortium agreement at the start of the project in order to settle questions arising from the assignment of Intellectual Property Rights (IPR) within the project. In addition, in Task 1 of WP3 (Excellence of Access), the management of Intellectual Property Rights will also be reconsidered and updated (if necessary) for each step of the experiment process: proposal for experiments, preparation and realisation of the experiment, data analysis and communication of results.

### 3.3 Consortium as a whole

- *Description of the consortium*

The main objective for IDEAAL is to transform GANIL into an international infrastructure. The purpose is to ensure the long-term sustainability of GANIL. Therefore, the IDEAAL consortium is coordinated by GANIL, as most of the work packages and tasks. Indeed, most studies and developments have to be initiated at GANIL or in close collaboration with GANIL teams.

Both members of the GIE GANIL, i.e. CEA and CNRS, will play a major role in IDEAAL project. CEA and CNRS currently own GANIL with each having a 50% stake. These institutions will be particularly active in the negotiations with potential partners (WP2). In addition, they will advise the teams of WP3, WP4 and WP5, based on their experience with other international infrastructures located in France.

IFJ PAN represents the non-French user community in the IDEAAL project. From recent studies, it is clear that Polish researchers are the most frequent users and visitors to the GANIL facility over the last several years. IFJ PAN is coordinating with GANIL the *Laboratoire International Associé* COPIGAL (international associated laboratory) between France and Poland for several years. In addition, IFJ PAN is leading the Instrumentation Coordination Committee of GANIL. Consequently, IFJ PAN will coordinate the task on user involvement in WP2.

GSI (Germany) will act as the international expert in the management of the in-kind contributions to the SPIRAL2 project. In this aim, they will use their experience in negotiations with the international partners of the FAIR facility.

Nucleopolis is a longstanding collaborator with GANIL for industrial applications at the regional level. This association is specialized in nuclear science and engineering for health and energy. Nucleopolis will coordinate the task on industrial valorisation in WP4.

- *Industrial/commercial involvement in the project to ensure exploitation of the results*

The Work Package 4 (Innovation and Industries) will be the interface between GANIL and industry within the IDEAAL project. In particular, industries will benefit from pilot access to SPIRAL2. In addition, two topics will be tested for technology transfer: beam profile monitors and production of radioisotopes.

- *Other countries and international organisations:*

All IDEAAL beneficiaries are based in the European Union.

### 3.4 Resources to be committed

- *Other direct costs (table 3.4b)*

<b>1 - GANIL</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel &amp; subsistence for trans-national access (if applicable)</b>	32580	Travel and subsistence expenses for users
<b>Other Travel</b>	629600	Travel expenses, meetings and conferences for WP1, WP2, WP3, WP4 and WP5
<b>Other goods and services</b>	61300	Communication material (exhibition, brochures, reports, web site) for WP5
<b>Total</b>	723480	
<b>2 - CNRS</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Other Travel</b>	50000	Travel expenses for WP2
<b>Total</b>	50000	
<b>3 - CEA</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Other Travel</b>	108000	Travel expenses for WP2 and WP4
<b>Total</b>	108000	
<b>4 - GSI</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Other Travel</b>	80000	Meetings and travel expenses for WP2 – task 3
<b>Total</b>	80000	
<b>5 – IFJ PAN</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Other Travel</b>	142000	Kick-off collaboration meeting, working meetings and travel expenses for WP2 – task 4
<b>Other goods and services</b>	4000	PC computers
<b>Total</b>	146000	

## 4. Members of the consortium

### 4.1 Participants (applicants)

- *GANIL*

GANIL (Grand Accélérateur National d'Ions Lourds) has been funded at Caen, France since 1983 as an institute for fundamental research to investigate and consolidate knowledge about the atomic nucleus. The laboratory is operated jointly by the National Institute of Nuclear and Particle Physics (IN2P3) belonging to the National Centre for Scientific Research (CNRS) and Direction de la Recherche Fondamentale (DRF) of the Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA). The relation between GANIL and its third parties CNRS and CEA in the IDEAAL project, especially in matter of personnel, is further developed in section 4.2.

The quality of beams delivered by its accelerators makes GANIL an outstanding facility used also by other disciplines, via laboratories associated with CIRIL (Centre Interdisciplinaire de Recherche Ions - Lasers) and ENSI Engineer's High School in Caen, gathered in an interdisciplinary research hub. The range of areas explored with GANIL beams extends from astrophysics to radiobiology, including the science of materials (ageing of materials, hardness of electronic components carried into space and of reactor vessels, etc.). With GANIL and its industrial applications department, several specialised companies have been formed in areas ranging from the production of microporous membranes (filters) to the development of new electronic modules and ion sources. The accelerator complex of GANIL comprises Electron Cyclotron Resonance (ECR) ion sources and five cyclotrons: two injectors and two sector-separated cyclotrons put in a cascade delivering stable beams and CIME large-acceptance cyclotron for the acceleration of radioactive ion beams at the SPIRAL facility operating since 2001. Up to 3 simultaneous beams in the energy range from 1 to 100 MeV/nucleon are available. The accelerators provide for users up to 10000 hours per year of heavy-ions beams. The SPIRAL2 facility, under construction, will extend the GANIL possibilities to heavier radioactive beams, and/or with much higher intensities: it will provide intense beams of neutron-rich exotic nuclei (106–1011 pps in the mass range 60 to 140), created by the ISOL production method. The layout of the SPIRAL2 driver is based on a superconducting linac driver, which will deliver a high-intensity, 40 MeV deuteron beam as well as a variety of heavy-ion beams with mass-to-charge ratio 3 and energy up to 14.5 MeV/nucleon. The SPIRAL2 accelerator is now under final installation, the beam commissioning should start during 2016. GANIL pursues high-quality, front-line scientific research and actively participates in education and instruction of (graduate) students and postdocs (about 100 each year) in an international environment. GANIL has 245 full-time employees. Permanent personnel working at GANIL are employed by either CNRS or CEA and not directly by GANIL.

About 700 researchers from 30 different countries visit GANIL each year to perform experiments.

The main tasks of GANIL within IDEAAL are the coordination of WP1 – Management, WP3 – Excellence of Access to Infrastructure, WP4 – Innovation and Industries, WP5 – Communication and Outreach, and the participation in WP2 – International Coordination and New Partners.

GANIL has experience in participation in European projects in the FP3 – HORIZON2020 EC framework programmes and in coordination of European contracts (EURISOL, SPIRAL2 Preparatory Phase, ENSAR, ENSAR2). In particular, a dedicated GANIL group, “Bureau de la Coopération Scientifique”, is specialised in project management. The GANIL staff has

successful experience in management of large infrastructure, large collaborations, innovation and communication.

Therefore, the facility is fully prepared to fulfil in an optimal way all tasks attributed to it in IDEAAAL, including IDEAAAL coordination and management.

For more information: <http://www.ganil-spiral2.eu/>

○ *Key persons in charge of activities*

GANIL works only with personnel seconded from CNRS and CEA. These personnel are listed here.

Role in the consortium: coordinator of IDEAAAL

Field of excellence, research area: experimental research on nuclear structure

Name: LEWITOWICZ

First Name: Marek

Nationality: Polish

Gender: male

2012 – present Deputy Director of GANIL

February 2008 Promoted as Directeur de Recherche 1ère Classe at CNRS

2005 – 2011 Scientific Director of SPIRAL2

2000 – 2005 Deputy Director of GANIL

September 1997 Promoted as Directeur de Recherche 2ème Classe at CNRS

October 1991 Employee as Chargé de Recherche 1ère Classe at CNRS at GANIL

July 1989 PhD in nuclear physics

Role in the consortium: deputy coordinator of IDEAAAL, leader of work package 1 - Management

Field of excellence: international cooperation

Name: LECERF

First Name: Sabrina

Nationality: French

Gender: female

2003 – Present Employee as Assistant Ingénieure at CNRS (GANIL), Officer of international collaborations

2006 – 2019 Officer of bilateral collaborations

2016 – 2019 Coordinator of an impact study (EU project)

2013 – 2015 Master2 degree in European projects management

Role in the consortium: leader of work package 3 – Excellence of Access to Infrastructure, leader of work package 3 – tasks 2 and 5

Field of excellence: administration

Name: FRANEL

First Name: Bertrand  
Nationality: French  
Gender: male

2016 - present Head of Administration of GANIL  
2011-2015: Cost controller in charge of the large research infrastructures (CEA-Saclay)  
2008-2011: Administrator of the EFDA close support unit in Garching, Germany (seconded in the frame of the European Fusion Development Agreement)  
1998-2007: Head of Administration of the Department of Fusion, (CEA-Cadarache)  
1995-1998: Head of the audit service of the financial Directorate (CEA)  
1992-1995: Responsible of the settlement of consolidated accounts of AREVA (ex CEA Industrie)  
1988-1992: Auditor in Auditorship companies, from assistant to senior level, in charge of missions in small and medium size companies mainly in industrial and services sectors  
Diploma: DESCF (Diplôme d'Etudes Supérieures Comptable et Financier)

Role in the consortium: leader of work package 3 task 1 – Definition of access policies for researchers, organization of the logistic support for researchers, and management of IPRs and ethical issues

Fields of excellence: business law

Name: JACQUET  
First Name: Stéphane  
Nationality: French  
Gender: male

Mr Jacquet is a Doctor in Business Law and has been working for CEA (French Atomic Commission) since 1998.

He was the Head of the legal Department of CEA from 2003 to 2006.

He is the Ganil's Head of the Legal and Purchasing Department since September 2006. He is the manager of 8 people. The Ganil purchases contracted abroad represent 30% of the total of the purchases' amount. Mr Jacquet was Work Package Leader for the FP7 Project, SPIRAL2 Preparatory Phase and has experience in leading Purchasing and Legal networks concerning public funded bodies' purchases in France.

Role in the consortium: leader of work package 3 task 3 – Data management

Fields of excellence: computing

Name: MENARD  
First Name: Nicolas  
Nationality: French  
Gender: male

2003 – present Head of Computer Service at GANIL, in charge of IT system safety for CNRS-IN2P3, and system administrator

2013 – present senior lecturer at University Institute of Technology, Caen, France

2001 Master in computer engineering and IT integration, CNAM, Caen, France

1998 – 2003 Applications manager, teaching hospital of Caen, France

1997 Analyst-programmer, ICOB, Caen  
1997 Computing diploma in software engineering, Paris, France  
1995 – 1997 Analyst-programmer, VOBIS Microcomputer AG, Paris, France

Role in the consortium: leader of work package 3 task 4 – How to improve efficiency  
Fields of excellence: management, quality, accelerators  
Name: SENECA  
First Name: Gilles  
Nationality: French  
Gender: male

2012 – present Deputy Director in charge of Technical Coordination and Quality at GANIL  
2005 – 2012: Head of the Accelerators Department at GANIL  
2002 – 2005: Deputy Head of the Accelerators Department at GANIL  
2000 – 2002: Head of the Power Supplies Group at GANIL  
1990 – 2000: Engineer in the Power Supplies Group at GANIL  
1989: Engineering degree in instrumentation of the Ecole Nationale Supérieure d'Ingénieurs de CAEN

Role in the consortium: leader of work package 4 – Innovation and Industries, leader of work package 4 – tasks 1 and 3  
Field of excellence, research area: innovation, accelerator research  
Name: MOSCATELLO  
First Name: Marie-Hélène  
Nationality: French  
Gender: female

2015 – present Officer in charge of innovation, industrial applications with beams and relations with industry  
2012 – 2015 GANIL Vice-Director in charge of safety-security-radioprotection-environment  
2010 – 2012 Responsible for Technical Audits of the SPIRAL2 project (50%)  
Responsible for the Machine Protection System of the SPIRAL2 facility (50%)  
2009 – 2010 Accelerator Project leader for the ARCHADE hadron-therapy centre in Caen, France  
2005 – 2009 Interim Project leader of the SPIRAL2 project, from January to July 2005  
Responsible for the Radioactive Beam Production and Acceleration of the SPIRAL2 project  
2001 – 2004 Responsible of GANIL Accelerator Development Group  
1998 – 2000 Head of the Operation of the GANIL accelerators  
1992 – 1998 Head of the “Theory and Parameters” Group in the Accelerator Division  
1991 – 1992 Design of the central region of the superconducting cyclotron K800, Catania, Italy  
1989 – 1991 Cyclotron studies – Design of the injection and extraction systems of a separated-sector superconducting cyclotron  
1989 – present Engineer, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA), GANIL, France  
1987 – 1989 Nuclear engineer – Design of nuclear fuel reloads for nuclear plants, Västerås, Sweden

1985 – 1987 Nuclear engineer in the nuclear fuel reprocessing plant in La Hague, France  
July 1985 Engineering Diploma (M.Sc.) at PHELMA-Grenoble INP in Energy and Nuclear Engineering

Role in the consortium: leader of work package 5 – Communication and Outreach

Main scientific activity: Communication strategy and tools

Name: GRAR

First Name: Myriam

Nationality: French

Gender: female

Myriam Garar has a Masters degree in Communication and Media from ISCOM Lyon (France). From 2011 to 2015, Myriam Garar worked as a project manager in a communication agency in Lyon. She set up communication strategies and tools for public bodies and private clients, mainly in cultural, technical and scientific fields.

In 2015, she joined GANIL as the communication officer of the laboratory. As such, she set up the communication strategy for the laboratory: definition of the communication goals, audiences, key messages and tools. The tools she implements aim general public, institutional and private partners, users and media. She writes and creates numerous communication tools (websites, leaflets, posters, exhibitions, reports...) while adapting the message to each audience. She closely works with partners to diffuse news about GANIL to its different audiences. She takes part of the local organizing committees for workshops, conferences and seminars organized by GANIL.

Additional temporary personnel to be hired.

In GANIL, CNRS personnel and CEA personnel work both under GANIL's control and at GANIL premises. The personnel working at GANIL are paid by CNRS and CEA.

#### ○ *Publications*

- Search for Superscreening Effects in a Superconductor, P. Ujic, F. de Oliveira Santos, M. Lewitowicz, et al., Phys. Rev. Lett. 110, 032501 (2013)
- Status of the SPIRAL2 Project, M. Lewitowicz, Acta Phys. Pol. B42, 877 (2011)
- The SPIRAL2 Project and experiments with high-intensity rare isotope beams, M. Lewitowicz, J. Phys.: Conf. Ser. 312 052014 (2011)
- Upgrade of the SPIRAL identification station for high-precision measurements of nuclear  $\beta$  decay, G.F. Grinyer et al., Nucl. Instr. Meth. A 741 18-25 (2014)
- Improved half-life determination and  $\beta$  delayed  $\gamma$ -ray spectroscopy for  $^{18}\text{Ne}$  decay, G.F. Grinyer et al., Phys. Rev. C 87 045502 (2013)

#### ○ *Projects*

- HORIZON2020 ENSAR2 Integrating Activity (coordinator)
- FP7 SPIRAL2 Preparatory Phase (coordinator)
- FP7 ENSAR Integrating Activity (coordinator)
- FP7 CRISP cluster of research infrastructures
- FP7 ERC-StG-2013 - Active Target and Time Projection Chamber (ACTAR TPC)





- **CNRS**

The Centre National de la Recherche Scientifique (National Centre for Scientific Research), CNRS is a government-funded research organisation, under the administrative authority of France's Ministry of Research. As the largest fundamental research organisation in Europe with an annual budget representing a quarter of French public spending on civil research, CNRS carries out research in all fields of knowledge and, in particular, in nuclear physics through one of its institutes: the National Institute of Nuclear and Particle Physics (IN2P3). IN2P3/CNRS's mission is to promote and coordinate the research activities in nuclear physics, high-energy physics and their applications. It coordinates programmes in these areas on behalf of CNRS and universities, in partnership with CEA. IN2P3/CNRS pursues front-line scientific research and participates in the education and instruction of (graduate) students and post-docs in preparing them for future careers in industry and academia. The 20 IN2P3 laboratories actively stimulate and participate in interdisciplinary fields of research, both within and outside of France. CNRS operates the state-of-the-art accelerator facilities GANIL (together with CEA/DRF) and ALTO. CNRS has an important experience in European projects in earlier EC framework programmes and in HORIZON2020. For the IDEAAL project, CNRS experience in management of very large international infrastructures will be a great advantage for the coordination of Work Package 2 – International Coordination and New Partners.

Furthermore, each participating CNRS laboratory has several specialised services that do research in basic and applied nuclear science. The members of these groups have successful experience with running advanced accelerator facilities, management of large collaborations and are recognised experts in techniques related to exotic beam production targets and ion-source technology, innovative accelerator techniques, microelectronics, data acquisition systems including fast sampling methods, simulation and construction of large detector set-ups.

- *Key persons in charge of activities*

Role in the consortium: leader of work package 2 – International Coordination & New Partners, leader of work package 2 – task 1

Field of excellence, area of research: Nuclear physics

Name: FARGET

First Name: Fanny

Nationality: French

Gender: Female

After spending 5 years at CNRS/IPNO working on interest nuclear reactions of new generation reactors, Fanny Farget joined the GANIL's physicist group in 2003 where she studied the fusion-fission reactions and was involved in the neutrons for Science project in link with SPIRAL2. In 2014 she became responsible of the physicist group of GANIL. In December 2015 she joined CNRS/IN2P3 Direction as Scientific Vice Director.

2015 – present Scientific Vice Director at CNRS/IN2P3

2014 – 2015 Leader of Physics Group, GANIL

2013 – 2014 Sabbatical year at the University of Santiago de Compostela, Spain

2011 – 2014 Deputy leader of Physics group, GANIL

2003 – 2010 Researcher in Physics group, GANIL

2002 – 2003 Leader of PACS group at CNRS/IPNO, Orsay France

1998 – 2002 Researcher in Spallation group at CNRS/IPNO, Orsay, France

1998 Employee as *Chargée de Recherche 2<sup>e</sup> classe* by CNRS

1996 – 1998 Post-Doc, GSI, Germany  
1996 PhD in Nuclear Physics, ISN Grenoble, France

Role in the consortium: management of IDEAAL project for CNRS

Field of excellence, area of research: European affairs

Name: MOQUET

First Name: Natacha

Nationality: French

Gender: Female

Natacha Moquet works at CNRS IN2P3 since 2015 where she operates as European Affairs officer at the IN2P3 International Office. She is notably in charge of accompanying IN2P3 labs proposals in the frame of H2020 programme. She takes part in some coordination and support actions in the frame of the CNRS IN2P3 running projects where she brings her expertise on legal and financial aspects.

○ *Publications*

- M. Caamaño, F. Farget, et al., Phys. Rev. C 92, 034606 (2015)
- M. Caamaño and F. Farget, Access to scission observables from fission fragment velocities, Physics Procedia 64 (2015) 114 – 119
- C. Rodríguez-Tajes, F. Farget, et al., Transfer reactions in inverse kinematics, an experimental approach for fission investigations, Phys. Rev. C 89 (2014) 024614
- A. Navin, et al., Towards the high spin-isospin frontier using isotopically-identified fission fragments, Phys. Lett. B 728 (2014) 136
- M. Caamaño, O. Delaune, F. Farget, et al., Isotopic Yield Distributions of Transfer- and Fusion-Induced Fission from  $^{238}\text{U}+^{12}\text{C}$  Reactions in Inverse Kinematics, Phys. Rev. C 88 (2013) 02460

○ *Projects*

- ENSAR2 - European Nuclear Science and Application Research 2, H2020-INFRA-IA-2015, Grant Agreement No. 654002
- AIDA 2020, INFRA-IA
- EURO CIRCLE, H2020-INFRA-DEV-RIA 2015,
- SPIRIT – Support of Public and Industrial Research using Ion Technology, FP7-Infrastructures-2008, Grant Agreement No. 227012
- FP7 SPIRAL2 Preparatory Phase

- **CEA**

The CEA is the French Alternative Energies and Atomic Energy Commission (Commissariat à l'énergie atomique et aux énergies alternatives). It is a public body established in October 1945. A leader in research, development and innovation, the CEA mission statement has two main objectives: to become the leading technological research organization in Europe and to ensure that the nuclear deterrent remains effective in the future. In relation with the present project, CEA plays a leading role in all the major programmes in fundamental physics and with a top-level expertise in the development of instruments for this programme. Thus it has all the skills required to progress in the field of detection set-up, combining knowledge and know-how in detector physics, associated electronics and signal processing. Several CEA teams have been already involved in similar, successful programmes like Musett (silicon detector for the detection of heavy ions) or GET (General electronics for TCP) and consequently possess the expertise and the equipment to pursue a high-level research and development task in detector technology.

CEA operates GANIL infrastructure jointly with CNRS/IN2P3. Since decades, CEA participates and coordinates European projects in previous framework programmes of the European Commission and now in HORIZON2020. In addition, CEA operates numerous international infrastructures. Therefore, its experience will be precious for the coordination of Work Package 2 – International Coordination and New Partners.

- *Key persons in charge of activities*

Role in the consortium: leader of work package 2

Field of excellence, research area: Nuclear energy

Name: FAURY

First Name: Maria

Nationality: French

Gender: Female

Maria FAURY is director of international affairs and large research infrastructures, at the newly created Fundamental Research Division of CEA (French Atomic and Alternative Energy Commission). This division results from the merging of two former basic science divisions, the Physical Science division and the Life Science division. She is presently French representative in various boards such as ESRF and Soleil (European and national synchrotron), ILL (European neutron research reactor), F4E (Fusion for Energy), XFEL (European X ray free electron lasers).

She was previously deputy director of the Physical Science division and director of programs and evaluation (2014-2015).

From 2011 to 2013, Maria FAURY was Scientific Director of the sector “Energy, Sustainable Development, Chemistry and Process Engineering” at the French Ministry of Higher Education and Research. She was member of the board of French public research institutes such as IRSN (nuclear safety and radioprotection), ANDRA (nuclear waste management), IFPEN (fossil and renewable energies Institute). She was also French representative in various European bodies such as the CCEFU (Consultative Euratom Fusion Committee, the SET Plan steering committee (European Strategic Energy Technology Plan), the ESFRI Forum (European Strategic Forum on Research Infrastructures).

From 2008 to 2011, she was head of the department “Plasma Wall Interaction” at the Institute for Research in magnetic fusion, at CEA.

From 2003 to 2008 she was head of department “Experimental Research on accidents” at the French Institute Nuclear Safety and radioprotection (IRSN). From 1999 to 2008, she was project experimental project leader of the Cabri International Program, devoted to reactivity-initiated accidents.

From 1996 to 1999, she was head of a research laboratory dealing with waste decontamination at the French Atomic and Alternative Energies Commission (CEA).

Role in the consortium: leader of work package 2 – task 1 Enlargement of membership towards academics and involvement of institutional funders

Field of excellence, research area: High-energy nuclear reactions and their applications

Name: ROUSSEL-CHOMAZ

First Name: Patricia

Nationality: French

Gender: Female

Patricia Roussel-Chomaz is Manager for Large Research Infrastructures in the Fundamental Research Division of the French Alternative Energies and Atomic Energy Commission, CEA. She obtained her PhD in 1986 in nuclear physics at Paris XI University (now Paris-Sud). After a few years at CEA Saclay and Lawrence Berkeley Laboratory, she obtained in 1991 a position of physicist at GANIL. She was in charge of the high resolution magnetic spectrometer, one of the experimental equipments available for the GANIL user community. She was also Head of the Physics Group (1996-2000), scientific coordinator of the SPIRAL2 project (2007) and scientific coordinator of GANIL (2008-2010). She joined the Physical Science Division of CEA in 2010, first as Manager in charge of Programs and Evaluation and took her present position in 2012.

She is member or advisor in Councils (or equivalent governing bodies) of several national research infrastructures: GANIL, SPIRAL2, Laboratoire Léon Brillouin (LLB/Orphée reactor), and European research infrastructures: ILL, FAIR, CTA, XFEL and ESS.

○ *Publications*

- D. Suzuki et al, Phys. Rev C93, 024316 (2016)
- L. Caceres et al, Phys. Rev. C92 014327 (2015)
- M. Vandebrouck et al, Phys. Rev C92, 024316 (2015)
- M. Vandebrouck, Phys. Rev. Lett. 113 , 032504 (2014)
- T. Al Kalanee, Phys. Rev C88, 034301 (2013)

○ *Projects*

- Member or expert in several Councils of projects presently under construction: FAIR, XFEL, ESS
- HORIZON 2020 ENSAR2
- FP7 ENSAR
- FP7 SPIRAL2 PP
- Design of the Super Separator Spectrometer for SPIRAL2 at GANIL

- **GSI**

GSI (GSI Helmholtzzentrum fuer Schwerionenforschung GmbH) operates a large accelerator complex consisting of the linear accelerator UNILAC, the heavy-ion synchrotron SIS and the experiment storage-cooler ring ESR. Ions of all elements, from hydrogen to uranium, can be accelerated up to energies of 1-2 A.GeV, highly ionised up to bare uranium, also secondary beams of unstable nuclei or secondary pions are available. The accelerators are complemented by technically advanced experimental facilities as well as a high-energy (kJ), high power (PW) laser system Phelix, which altogether offer outstanding opportunities for current and future research in the fields of hadron and nuclear physics, atomic physics, dense plasma research, material science, biophysics and radiation medicine.

Accelerators: The GSI accelerator complex provides ion beams of all stable elements up to uranium with energies from the Coulomb barrier up to 2 A.GeV. In addition, secondary beams of unstable nuclei are available as well as beams of highly ionised atoms up to bare uranium and beams of secondary pions. As a further option, secondary pion beams can be delivered at momenta of 0.5 GeV/c to 2.5 GeV/c. Several experiments can be performed in parallel, using different ions.

UNILAC, a 120m linear accelerator, provides intense ion beams (p to U) at energies up to 11.4 A.MeV. The UNILAC serves as an injector to the synchrotron SIS.

SIS, the heavy-ion synchrotron with 216 m circumference and a maximum bending power of 18 Tm accelerates particles of p to U up to 2 A.GeV.

FRS, a 75m Projectile Fragment Separator, provides unstable isotopes of all elements up to uranium.

In the ESR (Experimental Storage Ring), stable or radioactive ion beams can be stored and cooled at energies up to 0.56 A.GeV (for U).

The pion-beam facility provides pion-beams in the momentum range of 0.5 to 2.5 GeV/c.

Experimental facilities: GSI offers various stations for nuclear, atomic, plasma physics and material science experiments at the UNILAC and the SIS accelerators or the Experimental Storage Ring ESR of interest for the ENSAR community

- FRS – large in-flight projectile fragment separator for production and in-beam separation of nuclei far off stability
- R3B - Relativistic Radioactive Reaction Experiment to study high-lying collective states and complete kinematics break-up reactions of exotic nuclei
- SHIP spectrometer - velocity filter for separation and detection of super-heavy elements
- SHIPTRAP - Penning trap for nuclear structure and atomic physics studies on very heavy nuclei/atoms
- HITRAP - ion trap for atomic physics and nuclear structure studies on heavy, highly-charged ions at rest
- TASCA - Transactinide separator and chemistry apparatus to study single ion chemistry of super heavy ions
- In-Beam experiments at the ESR - equipped with: Schottky mass spectroscopy; time-of-flight mass spectroscopy using the isochronous operation mode of the ring; internal gas-jet target and detector system; various X-ray and position sensitive particle detectors; collinear laser spectroscopy system,
- PHELIX - high power, high energy laser for plasma physics experiments
- Two experimental stations for dense plasma research allowing the combined application of intense ion and PHELIX laser beams for plasma generation and diagnosis
- M-branch - three beam lines for materials research with in situ characterisation of irradiated samples (SEM, XRD, FTIR, UV-Vis, RGA, etc.)
- Various experimental stations for UNILAC or SIS experiments

Nature of user facility: With about 1300 users (approx. 1100 external), GSI is a user facility for the international science community.

Since the 3rd Framework Programme of the European Union, GSI has been recognised as a large scale European research infrastructure and has received EC funding respectively.

Future: GSI, together with national and international partner institutions, is planning the construction of the FAIR Facility for Antiproton and Ion Research. A superconducting double-synchrotron SIS100/300 with a circumference of about 1,100 meters and with magnetic rigidities of 100 and 300 Tm, respectively, is at the heart of the FAIR accelerator facility. Following an upgrade for high intensities, the existing GSI accelerators UNILAC and SIS18 will serve as injectors. Attached to the large double-synchrotron SIS100/300 is a complex system of storage-cooler rings and experiment stations including a superconducting nuclear fragment separator (Super FRS) and an antiproton production target. FAIR will supply radioactive ion beams and antiproton beams with unprecedented intensity and quality. Moreover, the facility is designed to provide particle energies 20-fold higher compared to those achieved so far at GSI (up to 35AGeV for U92+). A further important feature of the FAIR accelerator facility is that, due to the intrinsic cycle times of the accelerator and storage-cooler rings, up to four research programmes can be run in a truly parallel mode. This allows, in a very efficient and cost-effective way, a rich and multidisciplinary research programme to be conducted covering a broad spectrum of research fields such as: QCD studies with cooled beams of antiprotons; QCD-Matter and QCD-Phase Diagram at highest baryon density; nuclear structure and nuclear astrophysics investigations with nuclei far off stability; precision studies on fundamental interactions and symmetries; high density plasma physics; atomic and material science studies; radio-biological investigations and other application oriented studies. First operation of the FAIR facility is scheduled for 2019.

Until 2017 user operation at GSI is strongly reduced to allow for accelerator upgrades and re-building of the facility.

○ *Key person in charge of activities*

Role in the consortium: leader of work package 2 – task 3 In-kind contributions

Field of excellence, research area: nuclear physics

Name: SIMON

First Name: Haik

Nationality: German

Gender: male

03/2016 – present	Subproject leader Super-FRS in the FAIR Project division
08/2012 – 03/2012	Project Division Head of the Rare Isotope Beams Division (FAIR@GSI)
08/2011 – present	Deputy Department Head of the Research Division Nuclear Reactions @ GSI
since 04/2003	Permanent staff member of GSI
08/2000 – 03/2003	PostDoc: TU Darmstadt; Germany
08/1998 – 07/2000	Scientific Associate: CERN/ISOLDE
1998	PHD in nuclear physics, Technical University of Darmstadt
1994	Diploma in nuclear physics, Technische Hochschule Darmstadt

○ *Publications*

- Experimental program of the Super-FRS Collaboration at FAIR and developments of related instrumentation, Nucl. Inst. Meth. B (2016) in press.
- Exclusive measurements of quasi-free proton scattering reactions in inverse and complete kinematics, Phys. Lett. B753 (2016) 204.
- Beyond the Neutron Drip-Line, Nuclear Physics News 24 (2014) 5.
- First observation of the unbound nucleus Ne15, Phys. Rev. Lett. 112 (2014) 132502.
- Measurement of the Dipole Polarizability of the Unstable Neutron-Rich Nucleus Ni 68, Phys. Rev, Lett. 111 (2013) 242503.

○ *Projects*

- HORIZON2020 ENSAR2
- FP7 FAIR Preparatory Phase
- FP7 SPIRAL2 Preparatory Phase
- FP7 ENSAR Integrating Activity



- **IFJ PAN**

The Niewodniczanski Institute of Nuclear Physics of the Polish Academy of Sciences (Instytut Fizyki Jądrowej im. H. Niewodniczańskiego Polskiej Akademii Nauk - IFJ PAN), established in 1955, is a public research institute. The pursued research is aimed at explaining the structure of matter from microscopic to cosmic scales, through experiments and/or application of theoretical methods. The activity extends from both theoretical and experimental research, concerning the fields of particle physics and astrophysics, nuclear and strong-interactions physics, via condensed-matter physics, to interdisciplinary and applied research. The Institute has a staff of over 500 persons, including 45 full professors, 35 associate professors and around 120 post-docs. The International Post-Graduate Course at IFJ PAN has at present 50 students from universities of several countries. The Institute is pursuing an active cooperation with Polish universities which concerns research as well as education processes, and with leading institutes worldwide. Each year the Institute hosts international and national scientific conferences.

A part of the IFJ PAN is the Cyclotron Centre Bronowice (CCB), the proton-therapy and basic research facility, possessing the Proteus-235 proton cyclotron and the 60 MeV light-ion cyclotron AIC-144.

Researchers from IFJ PAN are among the most frequent users and visitors of GANIL infrastructure for several years. In addition, IFJ PAN leads two major collaborations with GANIL: the *Laboratoire International Associé* COPIGAL between France and Poland and the Instrumentation Coordination Committee of GANIL-SPIRAL2. Consequently, IFJ PAN will coordinate the task on user involvement in Work Package 2.

- *Persons in charge of activities*

Role in the consortium: leader of work package 2 – task 4 Involvement of academic users–representatives of large collaborations in User Board

Field of excellence, Research area: Experimental research on nuclear structure and reactions

Name: FORNAL

First Name: Bogdan

Nationality: Polish

Gender: male

2014 – present Head of the Division of Nuclear Physics and Strong Interactions at the Institute of Nuclear Physics PAN, Kraków, Poland

2014 Professor Title, nomination by the President of Poland

2010 – 2013 Head of the Department of the Structure of Atomic Nucleus at the Institute of Nuclear Physics PAN, Kraków, Poland

2005 – 2014 Associate Professor at the Institute of Nuclear Physics PAN, Kraków, Poland

2004 Doctor Habilitatus: Institute of Nuclear Physics, Polish Academy of Sciences, Krakow, Poland

1998, 2001, 2002 - visiting assistant professor at Purdue University, W. Lafayette, IN, USA

1991 – 1993 Post-doctoral position at Purdue University, W. Lafayette, IN, USA

1991 – 2005 Senior Research Associate at the Institute of Nuclear Physics, Krakow

1991 Ph.D.: Institute of Nuclear Physics, Kraków, Poland

1985 – 1987 Post-doctoral position at the INFN Laboratori Nazionali di Legnaro (Padova), Italy

1981 – 1991 Research Associate at the Institute of Nuclear Physics, Krakow

1981 M.Sc.: Jagiellonian University, Krakow, Poland

Role in the consortium: participation in work package 2 – task 4 Involvement of academic users– representatives of large collaborations in User Board

Field of excellence, research area: Experimental research on nuclear structure and reactions

Name: MAJ

First Name: Adam

Nationality: Polish

Gender: male

2013 – now Scientific Director of the Niewodniczanski Institute of Nuclear Physics, Kraków, Poland

2010 – 2012 Technical Director of the Niewodniczanski Institute of Nuclear Physics, Kraków, Poland

2009 – 2013 Head of the Division of Nuclear Physics and Strong Interactions at the Institute of Nuclear Physics, Kraków, Poland

2006 State nominated Professor, Warsaw, Poland

2003 – 2009 Head of the Department of the Structure of Nucleus at the Institute of Nuclear Physics, Kraków

2001 – 2006 Associated professor the Inst. of Nuclear Physics, Krakow, Poland

2001 Habilitation: Niewodniczanski Institute of Nuclear Physics, Krakow, Poland

1996 Visiting Professor in the Niels Bohr Institute, Copenhagen, Denmark

1989 – 1990 Post-doc position in the Niels Bohr Institute, Copenhagen, Denmark

1988 – 2001 Lecturer (adjunct) at the Institute of Nuclear Physics, Krakow

1988 Ph. D.: Institute of Nuclear Physics, Kraków, Poland

Role in the consortium: participation in work package 2 – task 4 Involvement of academic users– representatives of large collaborations in User Board

Field of excellence, research area: Theoretical research on nuclear structure and reactions

Name: MAZUREK

First Name: Katarzyna

Nationality: Polish

Gender: female

2014 – Habilitation: Niewodniczanski Institute of Nuclear Physics, Krakow, Poland

2013 – Specialist in Niewodniczanski Institute of Nuclear Physics, Krakow, Poland

2009-2011 Post-doc position in the Grand Accelérateur National d'Ions Lourds, Caen, France

2004 – 2013 Lecturer (adjunct) in the Niewodniczanski Institute of Nuclear Physics, Krakow, Poland

2004 - Ph. D.: University Marie Curie-Sklodowska, Lublin, Poland

○ *Publications*

- V.I.Zagrebaev, B.Fornal, S.Leoni, W.Greiner, Formation of light exotic nuclei in low-energy multinucleon transfer reactions, *Phys. Rev. C* 89, 054608 (2014).
- S.Bottoni, S.Leoni, B.Fornal, R.Raabe et al., Cluster-transfer reactions with radioactive beams: A spectroscopic tool for neutron-rich nuclei, *Phys. Rev. C* 92, 024322 (2015)

- K.Mazurek, J.Dudek, A.Maj, D.Rouvel, Nuclear Jacobi and Poincare transitions at high spins and temperatures: Account of dynamic effects and large-amplitude motion, Phys.Rev. C 91, 034301 (2015)
- K.Mazurek, C.Schmitt, P.N.Nadtochy, Description of isotopic fission-fragment distributions within the Langevin approach, Phys.Rev. C 91, 041603 (2015)
- M.Ciemala, M.Kmiecik, A.Maj, K.Mazurek et al, Giant dipole resonance built on hot rotating nuclei produced during evaporation of light particles from the  $^{88}\text{Mo}$  compound nucleus, Phys.Rev. C 91, 054313 (2015)
  
- *Projects*
  - HORIZON2020 ENSAR2 Integrating Activity
  - FP7 SPIRAL2 Preparatory Phase
  - FP7 ENSAR Integrating Activity
  - FP6 NUPNET

- *Nucleopolis*

Nucleopolis ([www.nucleopolis.com](http://www.nucleopolis.com)) federates in Normandy the nuclear expertise of companies involved in research, training and industry across the entire value chain of nuclear science in the fields of energy and health and in the transverse field of risk control.

Created in 2010, the cluster consists of over 75 members including renowned research and training organisations (GANIL, CEA, CNRS, ENSICAEN, Caen University, etc.), major industrial companies (AREVA, EDF, GDF-SUEZ and DCNS) and a fabric of successful SMEs. This know-how is the result of extensive experience gained in major nuclear installations such as the AREVA La Hague recycling plant, the Flamanville reactors, LSRF GANIL and tomorrow around innovating projects such as ARCHADE, SPIRAL2 and soon AREVA Med. The work carried out by Nucleopolis is structured around three strategic objectives on behalf of companies, the nuclear industry and Normandy with the sole aim of promoting the economic development of the Norman nuclear industry, and therefore employment.

One of the main objectives of Nucleopolis is to be at the service of companies and innovation. The purpose of this objective is to make companies more competitive by supporting them in their development projects targeting new markets and in their innovation strategies. Nucleopolis proposes four types of service to member companies, either directly or subcontracted:

- network management: allow the creation of consortia for invitations to tender or collaborative projects by networking with other companies, research or training organisations.
- market itinerary: allow companies to adapt to the specific aspects of the nuclear market, help them win new markets, simplify their export formalities and their relations with contracting authorities.
- skill itinerary: consolidate the know-how of companies and provide training support for their employees.
- innovation itinerary: develop innovation capabilities by fostering new ideas and projects, by communicating the innovation capabilities of research organisations, by acting as interface with laboratories outside Normandy and by helping with the search for partners, funding, etc.

The expertise of Nucleopolis in innovation and its network of industries is important for the innovation development of GANIL. Therefore, Nucleopolis leads the task 2 of Work Package 4 – Innovation and Industries. The person in charge of this leadership will be hired before the start of the IDEAAAL project, as new director of Nucleopolis.

- *Persons in charge of activities*

Role in the consortium: participation in Work Package 4 – Task 2 Industrial Valorisation  
Field of excellence, research area: Health, biology, nuclear technologies (health applications: radiotherapy, radiopharmaceutics), innovation

Name: DUVAL

First name: Elise

Nationality: French

Gender: female

2012 – present: Project manager in Nucleopolis (support to SMEs towards innovation and structuring of nuclear health sector)

2009 – 2012: head of R&D studies, KELIA (pharmaceutical company), Saint Malo, France

2009: PhD in biology, University of Caen Basse-Normandie, France

- *Projects*

In France, Nucleopolis participated in the definition of the smart specialization strategy of Normandy in which Nuclear Applications (Health application, Dismantling) has been chosen. Locally, Nucleopolis offers services to projects of innovative SME (currently: nearly 10 projects).

## 4.2. Third parties involved in the project (including use of third party resources)

### 4.2.1 GANIL

Does the participant plan to subcontract certain tasks (please note that core tasks of the action should not be sub-contracted)	Y
<p>1. In Work Package 3 (Excellence of Access to the Infrastructure) – Task 4, a specialized consulting company will analyse the internal organisation of GANIL. The estimated costs are 140 000 €.</p> <p>2. In Work Package 5 (Communication and Outreach) – Task 1 &amp; Task 3:</p> <ul style="list-style-type: none"> <li>• A study of the best communication strategy towards industry</li> <li>• Virtual visit and videos on GANIL for general public</li> <li>• Artistic partnerships</li> </ul> <p>The estimated costs are respectively 10 000 €, 13 500 € and 4 000 €.</p> <p>These studies and creation activities will require external consultants and companies since GANIL does not have these competencies.</p>	
Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N

### 4.2.2 CEA

Does the participant plan to subcontract certain tasks (please note that core tasks of the action should not be sub-contracted)	Y
<p>In Work Package 2 (International Coordination and New Partners) – Task 2, two studies will be performed by consulting companies:</p> <ul style="list-style-type: none"> <li>• A study for possible strategies to attract private funding for GANIL.</li> <li>• A legal study to explore possibilities for GANIL to receive and manage private funding.</li> </ul> <p>The estimated costs are 200 000 €.</p>	
Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N

### 4.2.3 Nucleopolis

Does the participant plan to subcontract certain tasks (please note that core tasks of the action should not be sub-contracted)	Y
In Work Package 4 (Innovation and Industries) – Task 2: a market analysis in the aim of technology transfer.  The estimated costs are 25 000 €.  The subcontractor is not known yet. A competitive call will be held in order to award the subcontractor. This subcontracting is in line with Article 13, with regards to the principle of best value for money.	
Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N

The other participants CNRS, GSI, and IFJ PAN do not have any third party in the framework of the IDEAAL project.

## 5. Ethics and security

### 5.1 Ethics

The IDEAAL project is dedicated to coordination and support actions. Therefore it does not present ethic issues.

During the IDEAAL project, the IDEAAL consortium will rigorously apply the ethical standards and guidelines of Horizon2020 regardless of the participating country.

## 5.2 Security<sup>1</sup>

**Please indicate if your project will involve:**

- activities or results raising security issues: NO
- 'EU-classified information' as background or results: NO

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<sup>1</sup> Article 37.1 of the Model Grant Agreement: *Before disclosing results of activities raising security issues to a third party (including affiliated entities), a beneficiary must inform the coordinator — which must request written approval from the Commission/Agency. Article 37.2: Activities related to 'classified deliverables' must comply with the 'security requirements' until they are declassified. Action tasks related to classified deliverables may not be subcontracted without prior explicit written approval from the Commission/Agency. The beneficiaries must inform the coordinator — which must immediately inform the Commission/Agency — of any changes in the security context and — if necessary — request for Annex 1 to be amended (see Article 55*