26/05/06

Call for Letters of Intent for Research at the SPIRAL 2 facility

The SPIRAL 2 facility, currently under construction at GANIL, Caen (France), is based on a high-power, superconducting driver LINAC, which will deliver a high-intensity, 40 MeV deuteron beam as well as a variety of heavy-ion beams with intensity of up to 1 mA and energy up to 14.5 MeV/nucleon (see www.ganil.fr for details). Using a carbon converter, fast neutrons from the breakup of the 5 mA of deuterons impinging on a uranium carbide target will induce fission with a rate of up to 10^{14} fissions/s. The rare isotope beam (RIB) intensities in the mass range from A=60 to A=140 will be of the order of 10^{6} to 10^{11} particles/s surpassing by one or two orders-of-magnitude any existing facility in the World.

The beams of neutron-rich fission products will be complemented by beams of nuclei near the proton drip line created in fusion-evaporation or transfer reactions. Similarly, the intense, heavy- and light-ion beams from LINAG on different production targets can be used to produce high-intensity beams of light radioactive species with the ISOL technique.

The extracted RIB will subsequently be accelerated to energies of up to 20 MeV/nucleon (typically 6-7 MeV/nucleon for fission fragments) by the existing CIME cyclotron.

SPIRAL 2 would allow one to perform experiments on a wide range of neutron- and proton-rich nuclei far from the line of stability using different production mechanisms and techniques to create the beams.

One of the most important features of the future GANIL/SPIRAL/SPIRAL 2 accelerator complex will be the capability of delivering up to five stable or radioactive beams simultaneously in the energy range from keV to several tens of MeV/nucleon. The use of intense RIB at the low-energy ISOL facility and their acceleration to several MeV/nucleon opens new possibilities in nuclear structure physics, nuclear astrophysics, reaction-dynamics studies, precision studies in the pursuit of fundamental interactions and symmetries as well as in atomic physics, condensed-matter studies, radio-biology and radiochemistry. Thanks to the high-energy and high-intensity neutron flux available at SPIRAL 2, the facility will offer a unique opportunity for material irradiations and cross-section measurements, both for fission and fusion-related research.

Further information on the facility and envisaged physics programme can be found in the "Scientific Opportunities with SPIRAL 2" at:
http://www.ganil.fr/research/developments/spiral2/whatisspiral2.html

The French Ministry of Research took the decision to build SPIRAL 2 at the end of May 2005. Its construction cost, estimated to be 130 M€ (including personnel and contingency), will be shared by the French funding agencies CNRS/IN2P3 and CEA/DSM, the authorities of the Region of Basse Normandie and contributions from European partners.

Following the preparation of the SPIRAL 2 Scientific Case, the SPIRAL 2 Workshops organised in 2004 and 2005 and the recommendations of the SPIRAL 2 Scientific Advisory Committee (SAC), the present call for Letters of Intent (LoIs) is being launched in order to attain the following **goals**:

- Assess the technical feasibility, space, infrastructure requirements and estimated cost of experiments.
- Identify any new equipment to be constructed.
- Formalise collaborations amongst the SPIRAL 2 users.
- Create the basis for defining the priorities for the scientific programme of SPIRAL 2.

The call is open to scientists working in **all disciplines and topics related to the SPIRAL 2 scientific programme**.
Both experimental and theory groups/collaborations are encouraged to submit LoIs.

It is recommended that the LoIs contain the following information:

- **Collaboration presenting the LoI**
  - List of authors and laboratories with identified spokespersons (maximum 3) with among them **one corresponding spokesperson as well as a contact person at GANIL (***Please contact Marek Lewitowicz (Lewitowicz@ganil.fr) if the collaboration can not identify a contact person at GANIL).*
- **Scientific case (typically 2-3 pages)**
- **Methodology (typically 2-3 pages)**
  - Requested Beam(s)
    - Nature, intensity, time resolution, purity, use of beam-tracking detectors, etc. (to be specified if possible)
  - Targets
    - Nature, thickness, etc. (to be specified if possible)
  - Instrumentation and detectors: to be constructed, request for modifications of existing equipment, etc.
  - Theoretical support: short description of the necessary calculations and developments
- **Preliminary schedule of the process leading to the signature of the Memorandum of Understanding and of the construction of new equipment.**
- **Preliminary evaluation of the cost of the equipment to be constructed as well as necessary manpower.**

Procedure and schedule:

The LoIs, following the attached template, should be sent in electronic form (preferably as a pdf file) to the Chairman of the SPIRAL 2 Scientific Advisory Committee *Muhsin Harakeh (harakeh@kvi.nl)* with a copy to the Scientific Co-ordinator of SPIRAL 2 *Marek Lewitowicz (Lewitowicz@ganil.fr)*.

- **Dead-line for the submission of the LoIs is October 2nd, 2006.**
- Evaluation of LoIs by the SPIRAL 2 SAC + additional experts (if necessary) will take place at the next SAC meeting October 19th and 20th. The evaluation process will include oral presentations of all LoIs by the corresponding spokespersons.
- Results of the evaluation including one of the following outcomes:
  - Proponents encouraged to present full proposal;
  - Proponents asked to provide additional information;
  - LoI proponents not encouraged to develop full proposal;

  will be communicated to the proponents by the end of October 2006.
- Call for full proposals will be launched in 2007.
- Signatures of MoU by collaborations proposing the construction of new equipment are foreseen in 2007-2008