

First circular for the “Physics with SPIRAL2 Heavy Ion Beams” workshop to be held at GANIL from December 12th to 16th 2022.

The purpose of the meeting is to bring together the Spiral2 community to prepare for the use of Heavy Ions beams delivered by the LINAC accelerator. The main goals are:

- obtain a comprehensive picture of the physics goals and update the physics programs;
- provide room for the creation of new initiatives and collaborative efforts, re-enforcing existing activities;
- bring together experimentalists and theoreticians in order to foster vital exchange between both communities;
- develop a scientific program, identifying the hot science topics with the relevant input from theory, and defining the experimental techniques and developments needed to achieve those scientific goals.

The workshop will be structured around three main axes of exchanges and discussions:

Accelerator, instrumentation and target development: overview of the status and progress of the LINAC accelerator, of the future injector NEWGAIN and of the experimental platforms S3-DESIR (DESIR expected to start in 2027) including their instrumentation. Those status reports will be complemented with contributions on the target and beam development.

Scientific program with S3 beams: review of recent experimental progress and theoretical development in the relevant fields. Update the experimental Day1 program (envisaged to start in 2024) and road-map for future campaigns. Discuss new opportunities and new ideas in the framework of the future injector NEWGAIN (expected to start in 2029).

New avenues with (very) heavy NEWGAIN beams: discuss new fields to be explored (multi-nucleon transfer reactions in heavy ion collisions, fusion evaporation in inverse kinematics, fusion-fission, interdisciplinary research, ...).

The science topics to be tackled at SPIRAL2 as presently discussed and envisaged by the community comprise:

- SHE/SHN research;
- Structure of $N=Z$ and more generally proton-rich nuclei;
- Low-energy physics @ S³LEB and DESIR;
- Interdisciplinary research;
- Atomic physics (FISIC @ S³);
- Deep inelastic collisions/multi nucleon transfer studies/fission studies/ fusion-evaporation in inverse kinematics;
- Other science opportunities to be pursued in future at GANIL.

The discussions at the workshop shall help to detail and extend this list by new ideas.

- All scientists willing to propose new scientific cases and/or new instrumentation developments are encouraged to submit a short abstract to the Workshop Organizing Committee. The deadline for submission of abstracts is **14th October 2022**.

No fee will be charged for the workshop. A visit of the SPIRAL2 site will be organized.

Workshop webpage: <https://workshopheavyionsbeams.sciencesconf.org/>

Vision of future GANIL: <https://www.ganil-spiral2.eu/2022/03/28/vision-for-the-future-of-ganil/>

NEWGAIN White Book: <https://www.ganil-spiral2.eu/scientists/ganil-spiral-2-facilities/accelerators/newgain/>

S³ beams: <https://u.ganil-spiral2.eu/chartbeams/>