

# **First Physics with the Super Separator Spectrometer S3**

**Monday 27 March 2017 - Thursday 30 March 2017**

**CEA Saclay, Orme des Merisiers**

## **Programme scientifique de la conférence**

S<sup>3</sup> is dedicated to the studies of rare events in nuclear and atomic physics, studies that are made possible thanks to the very high intensities of the LINAG heavy ion beams. So far, several letters of intent have been proposed for S<sup>3</sup>, covering a wide range of physics topics. The main focus of S3 physics is the nuclei produced by fusion-evaporation reactions, from medium nuclei at the proton drip line up to the superheavy element region, and the study of their decays, ground states or isomeric states properties. Moreover, the S<sup>3</sup> program covers the study of reaction mechanisms, especially for low cross-section channels, in nuclear but also in atomic physics (electron exchange in beam-beam reactions). The main areas of research fit into three broad categories:

- Super-Heavy Elements (SHE) synthesis,  $Z > 104$ , and Very Heavy Elements (VHE) produced by fusion-evaporation reactions, in order to perform their spectroscopy or ground state properties and isomeric state studies. Detailed decay spectroscopy studies and high precision mass measurements could be possible depending on the production rate.
- Production and spectroscopy of neutron deficient nuclei, close to the proton drip-line. Neutron deficient and  $N=Z$  nuclei will be produced by fusion-evaporation reactions for various studies, for example, single particle structure, collectivity effects, shape coexistence, or ground state properties.
- Ion-ion atomic interactions to study electronic exchange cross sections for plasma physics. This research axis is developed by the "Fast-Ion Slow-Ion Collisions" (FISIC) collaboration.

The goals of the workshop are :

- Goal 1: Overall view of the physics goals and update of the physics programs
- Goal 2: Creation of new collaboration, re-enforcing the already existing
- Goal 3: Gather together experimentalists and theoreticians in order to create strong collaboration between both fields.
- Goal 4: encourage exchanges among the different groups focus in different areas of the nuclear chart
- Goal 5: Forming of working groups based on experimental synergies to study the technical developments needed to accomplish the foreseen Lols.
- Goal 6: Development of future proposals, definition of needs to accomplish the experiments, theoretically and technically wise.