Status and plans for S3

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The in-depth study of the regions of Superheavy elements and the proton dripline around 100Sn are two major chalenges of todays' Nuclear Physics. Performing detailed spectroscopic studies on these nuclei requires a significant improvement of our detection capabilities.

The Super-Separator-Spectrometer S3 is part of the SPIRAL2 facility at GANIL. Its aim is to use the high stable beam currents provided by the new LINAC to reach rare isotopes by fusion-evaporation. S3 is designed to provide the best rejection power along with a high transmission and a mass resolution of around 400. The use of high-acceptance superconducting multipoles provide a high transmission thanks to large gaps and higher-order optical corrections. These features, connected to a high power target station, will provide access to nuclei with fusion-evaporation cross-section down to the picobarn region and bellow.

S3 is equipped with two complementary detection setup. SIRIUS is designed to study the decay spectroscopy of superheavy nuclei. Its state of the art digital electronics and windowless silicon detectors will provide a high detection efficiency for the identification and alpha decay spectroscopy of short-lived elements combined with an array of high-purity Germanium clover detectors for gamma-ray spectroscopy.

REGLIS3 is a Resonant Laser Ionisation Spectroscopy device designed to study the ground state and isomeric state properties of rare isotopes. The use of narrow bandwidth lasers to select and ionize atoms will provide an additional Z selection and allow to access the spins, moments and charge radius of nuclei transmitted by S3. The high efficiency of the in-gas jet ionization allows to access nuclei in the superheavy and ^{100}Sn region.

This presentation will describe the technical capabilities of S3 and its detection systems, a status of the construction of all systems and give an overview of the Physics Cases planned for the first experiments.