

Nuclei: from Fundamental Interaction to Structure and Stars. Spectroscopy with AGATA and future perspectives with SPES

Thursday, 24 May 2018 15:45 (20 minutes)

The steady progress over the past twenty years in the development of beams of radioactive isotopes has allowed to vastly expand the objectives of experimental nuclear research. It is becoming possible to study in the laboratory a range of nuclear reactions that take place in exploding stars providing crucial information to understand how the chemical elements that we find on Earth were formed. Radioactive nuclei, selectively produced and identified, allow the study of fundamental symmetries in the low energy limit challenging theories developed at the highest energy frontier. These studies are among the objectives of the SPES radioactive ion beam project of INFN, presently in the construction phase at the Legnaro National Laboratories. It will provide high intensity and high-quality beams of neutron-rich nuclei to perform forefront research in nuclear structure, reaction dynamics and interdisciplinary fields like medical, biological and material sciences. SPES is a second generation ISOL radioactive ion beam facility, part of the INFN Road Map for the Nuclear Physics; it is supported by the Italian national laboratories LNL (Legnaro) and LNS (Catania). It is based on the ISOL method with an UCx Direct Target able to sustain a power of 10 kW. The primary proton beam is delivered by a Cyclotron accelerator with an energy of more than 40 MeV and a beam current of 200 μA . Neutron-rich radioactive ions will be produced by Uranium fission at an expected fission rate in the target of the order of 1013 fissions per second. The exotic isotopes will be re-accelerated by the ALPI superconducting LINAC at energies of 10A MeV and higher, for masses in the region of $A=130$ amu, with an expected rate on the secondary target of 107-109 pps. The status and the perspectives of the project, will be presented together with the scientific program (specially focusing on nuclear spectroscopy) and the related detector developments.

Primary author: Prof. DE ANGELIS, Giacomo (INFN LNL)

Presenter: Prof. DE ANGELIS, Giacomo (INFN LNL)

Session Classification: session 10