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The continuous quest for reaching new Horizons @ GANIL

Nuclei at the extremes of existence provide a playground for searching and understanding simple and regular patterns that are found in the structure of complex nuclei. Reactions involving nuclei at the extremes of stability not only allow us to amplify specific aspects of the nuclear interaction and observe new phenomena but also provide important inputs for “applied” fields ranging from finding potential isotopes for medicine to understanding astrophysically important processes. Radioactive Ion Beams have been the workhorse for the production and characterization of nuclei with a large asymmetry of neutrons and protons. In parallel, studies using reactions with beams far from the dripline (stable beams) coupled with improved sensitivity at energies around the Coulomb barrier have allowed us to probe nuclei under new conditions involving both high isospin and angular momentum.

In this talk, we will first give flavor of recent results and opportunities using intense stable and short-lived beams (ISOL and fragmentation) and a variety of new and state of art equipment at GANIL, to probe the three axis of nuclear physics namely excitation energy, angular momentum and the asymmetry of neutrons and protons. The talk will also mention on new inroads and at energies around the Coulomb barrier using a large acceptance spectrometer coupled with a gamma array, into exploring a) physics at a possible new frontier for nuclear physics namely BOTH high spin and isospin and b) potential of the production of new isotopes around and beyond the neutron shell $N=126$ for nuclei below Pb by multinucleon transfer. The current status of the of LINAC along with the associated equipment (SPIRAL2) and future plans for the high intensity frontier will also be presented.

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