Towards the next frontier of large Isopin *and* spin using beams far from the dripline

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In the mid eighties there were two major experimental break throughs in nuclear physics; one by Tanihata and his collaborators [1] on the existence of the halo phenomenon in neutron rich nuclei and the other was by Twin and his collaborators [2] on the existence of very large deformation at high angular momentum. In the last decades great advances have been made in understanding the evolution the many facets of a nucleus *independently* at high angular and at large isospin. The latter exploited the great advances in the resolving power of gamma-ray detectors and used fusion reactions at energies around the barrier and the former is driven by technical advances in the production of high energy secondary short lived beams and first generation re-accelerated beams and their associated instrumentation.

One of the question which will be addressed by next generation high intensity ISOL facilities like SPIRAL2 and EURISOL would to search for and understand new phenomena when the nucleus is *both* at large isospin AND large angular momentum. In this talk we will focus on the first steps towards this goal and the next frontier of nuclear physics made at GANIL from the measurements of prompt gamma rays in coincidence with fragments, identified in M and Z, produced in fission reaction around the Coulomb barrier using beams far from the dripline (stable beams). Measurements of prompt gamma rays in coincidence with isotopically-identified fission fragments, produced in collisions of ^{238}U on a ^{9}Be target, at an energy around the Coulomb barrier, will be presented. Selected results using this technique which provides simultaneous access to the spectroscopy of many nuclei, extending to very neutron-rich isotopes and relatively high angular momenta will be presented. The complementarity of the present work with the conventional high-fold gamma-concidence method will also be discussed. The status of planned coupling with the next-generation γ-ray tracking detector AGATA to EXOGAM and VAMOS++ will be also be briefly discussed.

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References

[1] I. Tanihata *et al.*, Phys. Rev. Lett. **55** 2676 (1985).
[2] P.J. Twin *et al.*, Phys. Rev. Lett. **57** 811 (1986).