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New spectrometer projects for challenging particle-gamma measurements of nuclear reactions

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Particle gamma coincidence measurements are an effective tool for the investigation of nuclear reactions in the cases where the particle spectra energy resolution is insufficient to separate nearby excited nuclear states. Two new spectrometer projects are under development, with some challenging technical characteristics in common, one for the investigation of weakly bound nuclear beam reactions at near barrier energies, and the other for the measurement of double charge exchange reactions in the 15-50 MeV per nucleon range, which are analogous to neutrinoless double beta decay, and are an important input to neutrino physics devellopment. The first one is being developed and tested at the Laboratório Aberto de Física Nuclear - LAFN (IFUSP/DFN, Brazil) under a FAPESP grant, and, the other, is going to be built and installed at the Laboratori Nazionali del Sud –LNS (INFN/Catania, Italy), under the NUMEN collaboration. The characteristics of the two projects, as well as their challenging experiments and physics cases will be presented and discussed.

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