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Nuclear structure with AGATA using post-accelerated radioactive beams

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AGATA (Advanced Gamma-ray Tracking Array, www.agata.org) is the European forefront instrument for high-resolution γ-ray spectroscopy based on high-purity segmented germanium detectors. Thanks to its fine segmentation, digital data acquisition electronics and pulse-shape analysis techniques, AGATA can track the path of a gamma ray inside the spectrometer to reconstruct its emission angle as well its full energy. This ensures an unprecedented combination of detection efficiency and resolving power. AGATA is a travelling instrument, used to perform experimental campaigns at leading European nuclear research facilities. Its importance will further increase in the future as AGATA is particularly suited for experimental conditions expected at the future facilities delivering intense radioactive ion beams as well as high-intensity stable ion beams, which are currently under construction in Europe. AGATA is presently is its seconde phase of construction with the goal of constructing a 3-pi array by 2030 [1-3].

AGATA was located between 2014 and 2021 at the GANIL facility, Caen-France. Combined to the high resolution MUGAST charged particle array [4] and the VAMOS magnetic spectrometer, a large campaign of in-beam spectroscopy was performed using the post-accelerated radioactive beams from the SPIRAL1 facility. The physics subjects cover the spectroscopy of un-bound states, astrophysics, shell evolution and the role of the 3-body term in ab-initio calculations. Published and unpublished results will be presented [5].

The current experimental campaign is running at LNL until end of 2026. Beyond that horizon, the AGATA collaboration will decide the next location of the array. Possible candidates are European radioactive beams facilities such as SPES with post-accelerated fission fragments, GANIL with light post-accelerated RIBs from SPIRAL1, GSI/FAIR, and the University of Jyvaskyla or HIE-ISOLDE at CERN. The specific strengths of each of these installations as well as envisaged physics cases are described in the AGATA White Book [3].

References :

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