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MUGAST: an highly-segmented particle array for the forthcoming science campaign with radioactive beams at GANIL

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MUGAST is a state-of-the-art silicon array, including MUST[1], GASPARD[2] and TRACE[3] detectors, that allows reaction and structure studies in combination with gamma-ray tracking spectrometers and enables the possibility to use, in the near future, the innovative PSA technique, developed by our collaboration[4].

The MUGAST configuration provides a large angular coverage that allows the study of stripping reaction such as (d,p),(3He,d), (3He,p), (6Li,d), etc., which requires detection of the recoil particle at angles ranging from the very backward angles to 90 degrees or lower, while being compatible with the present AGATA[5] configuration, as it is installed at VAMOS[6]. In fact, the high-granularity of the silicon array has been natively designed for optimal integration in new-generation gamma-ray tracking detectors with the aim of performing high-resolution studies. This will allow a very large gain in excitation energy resolution, in comparison with the case where the excitation energy is deduced from the recoil charged-particle measurement.
The MUGAST array has been designed to be compatible with the cooled-gas 3He or 4He target, as the one developed at IPNO for MUST2 experiments, as well as the conventional solid targets, such as CH2, CD2, LiF.

The significant development in the instrumentation led to the compelling proposition of combining MUGAST+AGATA with the magnetic spectrometer VAMOS, with the aim to deliver a campaign around transfer reactions as a core component of the future scientific programme at GANIL, in 2018. Much interest has been demonstrated by the the large number of LoIs submitted for the future campaign, ranging from shell evolution to nuclear astrophysics.

The present contribution focuses on the status and progresses of the project and the future physics campaign outlined at GANIL by using the upgraded SPIRAL1 facility.

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Track Classification: New instrumentation for direct reaction studies of exotic nuclei