

## M2 internship in experimental nuclear physics and quantum physics

### First experiments with ACTAR TPC at GANIL

The use of active targets and time projection chambers in nuclear physics experiments can be traced back nearly 30 years. These detectors, in which the detection medium is also used as a target for nuclear reactions, have found profitable applications due to their intrinsic high efficiency and their ability to be operated with a very large effective target thickness while maintaining the ability to track low-energy recoil particles. The combination of rapidly decreasing beam intensities for nuclei produced furthest from stability with the properties of reactions performed in inverse kinematics provides an ideal niche for such "high-luminosity" detection systems at rare-isotope beam facilities around the world. Recent developments in micro-pattern gaseous detector technology, high-density mechanics and front-end electronics and high throughput data-acquisition systems now overcome many of the limitations associated with existing detection systems. ACTAR TPC, designed and built at GANIL, is a state-of-the-art active target. It is composed of a pad plane of 128x128 pads, connected to the digital GET electronics, making possible to sample the reaction volume into 8 Mega voxels on an event-by-event basis. ACTAR TPC will be exploited for the first time in 2019 in a campaign using fragmentation beams on the LISE beam line at GANIL.

The candidate will actively participate in this campaign: she or he will strongly be implied in the installation of the detector in LISE and in the several tests that will occur prior to the first experiment. She or he is expected to participate in the online analysis of the data that will be acquired during the experiment.

#### Expected skills:

- Skills in instrumentation, detector physics
- Skills in C/C++, signal and image processing
- Interest in fundamental physics
- Good communication skills, team work

This internship does not lead to a PhD thesis.

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