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## Measurement of the underground argon radiopurity for Dark Matter direct searches

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A major global effort is currently underway to obtain underground argon for DarkSide-20k (DS-20k), the first large-scale detector of the Global Argon Dark Matter Collaboration (GADMC). Assessing the purity of the underground argon in terms of Ar-39 is crucial for the physics program of this experiment. To achieve this goal, the GADMC is building the DArTinArDM experiment at the LSC laboratory in Spain.

The radiopure DArT chamber (~1 liter), containing underground argon, will be placed in the center of the ~1 ton atmospheric argon ArDM detector, serving as an active veto for gamma radiation from the detector materials and surrounding rock. DArTinArDM is designed to measure the Ar-39 depletion factor in the underground argon with a sensitivity better than 1 mBq/kg, ensuring the radiopurity level of the different underground argon batches necessary for DS-20k.

The DArT chamber is currently operating underground at Laboratorio Subterráneo de Canfranc (LSC) in a test cryostat, with the purpose of setting protocols for hardware and software operations, optimizing the operating conditions of the setup and developing analysis tools.

In parallel, the ArDM detector is being refurbished with a new passive shield and a new light detection system to improve its performances in minimizing and rejecting background events.

In this talk, I will provide an overview of the status and prospects of the DArTinArDM project.

### Submitted on behalf of a Collaboration?

Yes

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