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Status and prospects of the low radioactivity Argon for dark matter searches

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A major global effort is currently underway to obtain radiopure argon for DarkSide-20k (DS-20k), the first large-scale detector of the Global Argon Dark Matter Collaboration (GADMC). The Urania project aims to extract underground argon (UAr) from CO₂ wells in the USA at a production rate of approximately 300 kg/day. Additional chemical purification of the UAr will be necessary before it can be used in the DS-20k LAr-TPC. The Aria project will purify the UAr using a cryogenic distillation column (Seruci-I), located in Sardinia, Italy. To assess the radiopurity of the UAr in terms of Ar-39, the GADMC is building the DArTinArDM experiment at the LSC laboratory in Spain. The DArT chamber (~1 liter) containing underground Argon will be placed in the center of the ~1-ton atmospheric argon ArDM detector, which acts as an active veto for gammas from the detector materials and surrounding rock. DArT is designed to measure the Ar-39 contamination in the UAr with a sensitivity better than 1 mBq/kg, ensuring the radiopurity level of the different UAr batches necessary for DS-20k.

In this talk, I will provide an overview of the status and prospects of the UAr projects for DarkSide-20k.

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