



Contribution ID: 290

Type: **Parallel Session talk**

## Low Radioactivity Argon for Dark Matter and Rare Event Searches

*Tuesday 6 August 2019 17:15 (12 minutes)*

### Summary

The DarkSide-50 dark matter search experiment demonstrated that argon derived from deep underground sources can be highly reduced in  $^{39}\text{Ar}$ , and since then the demand for this commodity has risen. Several fundamental physics experiments require argon reduced in  $^{39}\text{Ar}$  as well as  $^{42}\text{Ar}$ , as well as other rising needs in other scientific fields (e.g., age-dating). With the expanded needs come the questions of availability and how to approach the challenges associated with its production and characterization.

This talk will provide a global picture of low-radioactivity underground argon procurement, from its production to quality control and quality assurance. We will detail the DarkSide-20k plan for extracting more argon from the DarkSide-50 source through a project called Urania, as well as another project which will serve to isotopically separate  $^{39}\text{Ar}$  from  $^{40}\text{Ar}$ , called Aria. Finally DART is a small (~1 L) chamber that will measure the depletion factor of  $^{39}\text{Ar}$  in UAr. The detector will be immersed in the LAr active volume of ArDM (LSC, Spain), which will act as a veto for gammas, allowing a precise measurement of the  $^{39}\text{Ar}$  residual activity.

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**Session Classification:** Rare Event Detectors (Parallel)