



Contribution ID: 8

Type: **Presentation**

Analysis of the purity of the argon used by the MicroBooNE experiment by ICPMS technique

Wednesday, 21 September 2022 15:10 (15 minutes)

Mass spectrometry is typically used to measure U and Th contamination of the materials used to build a low-background detector. However, this technique has the potential to provide essential information about the purity of the gas used by argon-based rare event research experiments. The CIEMAT-DM group has shown that, by ICPMS, it is possible to identify and quantify contaminants in the argon, a piece of information that is typically not exploited. We did preliminary tests with the gas extracted from the ArDM experiment at LSC, proving this technique's viability and identifying the mercury contamination in the argon used in this experiment. This unexpected contamination had to be accounted for in the experiment's light propagation model. A more recent analysis has been performed with the gas extracted from the MicroBooNE detector. We identified some typical argon contaminants in this case and compared the ICPMS results with commercially available argon gas.

This talk will present the idea behind this technique, the preliminary results, and some prospects for future experiments.

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Session Classification: Long-term light yield stability

Track Classification: Detector techniques (HV, purification, cryogenics, calibration etc.)