

Aria project: a cryogenic distillation column for isotopic separation

Thursday, 8 October 2015 13:30 (15)

DarkSide 20k is a dark matter search experiment whose active target is argon in a double phase TPC. The residual internal background consists in the ^{39}Ar isotope inside the target. The collaboration developed a strategy consisting in the extraction of Argon from underground CO_2 wells, than distilled in a very tall cryogenic distillation column. DarkSide 50 already demonstrated the depletion in ^{39}Ar in the underground Argon by a factor bigger than 300. Aria project covers the second part of the strategy and consists in a 350 m tall column installed in Italy, in the Sardinia region, that exploits the tiny difference in volatility due to the difference in isotopic mass. Codes for calculation of relative volatility of argon isotopes, based on the extensive and detailed models available in the literature have been developed and short cut simulations based either on the McCabe-Thiele method or the Fenske-Underwood-Gilliland (FUG) method, or its derivative Wynn-Underwood-Gilliland (WUG) showed that every single pass in the column should reduce the ^{39}Ar content by a factor 10. The same technology can be applied to the separation of other stable isotopes of commercial interest. A description of the Aria project will be presented.

Presentation type

Section talk (10+5 min)

Primary author(s) : Mr. GORETTI, Augusto Mario (INFN-LNGS)

Presenter(s) : Mr. GORETTI, Augusto Mario (INFN-LNGS)

Session Classification : Nuclear physics and particle physics - parallel IX

Track Classification : Nuclear physics and particle physics