

Understanding and suppressing radioactive noble gas background in liquid xenon detectors

In the last years, liquid xenon detectors became very popular in the field of low energy rare-event search. With the increasing size of the detectors, external radiation is no longer the dominant background source in the latest generation of experiments. Instead, the achievable radio-purity is limited by internal contamination due to radioactive noble gas impurities, in particular ^{85}Kr and ^{222}Rn .

Using the XENON1T dark matter experiment as example, this talk will discuss the following options for the mitigation of radioactive noble gas background: 1: Identification of sources by thorough material selection with improved screening techniques. 2: Elimination of sources with dedicated cleaning methods. 3: Understanding and avoiding re-contamination processes. 4: Online removal of radioactive noble gases during the run-time of the experiment.

The progress and obtained results of the different approaches in the XENON1T experiment will be presented and an outlook for future improvements will be given.

Authors: Dr SIMGEN, Hardy (Max-Planck-Institut für Kernphysik); Dr BRÜNNER, Stefan (Max-Planck-Institut für Kernphysik)

Presenter: Dr SIMGEN, Hardy (Max-Planck-Institut für Kernphysik)