

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.

Primary 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)