

Name of research institute or organization:

Physik Institut, Universität Zürich
Albert Einstein Center for Fundamental Physics, Universität Bern

Title of project:

Cosmogenic Activation of ultra-pure Xenon

Project leader and team:

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Project description:

Ultra-pure xenon is a widely used target material in experiments searching for the dark matter particle in low background experiments. Potential cosmogenic activation of the target material (during transport etc.) is not well known, but might be a relevant source of background. With this experiment at HFSJG we aim to quantify cosmogenic activation after exposing an ultra-pure xenon gas sample (~2 kg) to cosmic rays at the high altitude of Jungfrauoch. We have exposed a few kg of OFHC low-background copper as well.

The intrinsic radioactive background of the xenon gas (as well as the copper) was measured in the LNGS underground laboratory (Italy) with a high-purity Germanium (HPGe) detector before starting the exposure at the Jungfrauoch on October 31, 2012. During 2013, the samples were exposed to the increased cosmic ray flux for 345 days until October 11, 2013, when they were shipped back to LNGS and brought underground. Transportation was done by car in order to avoid additional activation in an airplane. At LNGS, both samples were measured again for radioactive impurities using the HPGe detector. The measurements were performed immediately in order to be able to detect as many short-lived isotopes as possible.

Some lines from activated xenon were visible right away. At the moment we are analyzing the data in a more detailed way and work on simulations relevant for the interpretation. The analysis of the copper sample will follow subsequently. A publication of the results is planned for 2014.

Key words:

Cosmogenic activation, low background physics

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