Name of research institute or organization:

Physik Institut, Universität Zürich

Title of project:

Cosmogenic Activation of ultra-pure Xenon

Project leader and team:

Dr. Marc Schumann, Prof. Laura Baudis, Dr. Alfredo Ferella, Dr. Alexander Kish, Francesco Piastra

Project description:

Ultra-pure xenon is a widely used target material in experiments which aim to directly detect particle dark matter in low background experiments. Potential cosmogenic activation of the target material during transport etc. is yet unknown, but might be a relevant source of background. With this experiment at the research station Jungfraujoch we aim to quantify cosmogenic activation after exposing a xenon sample to cosmic rays at the high altitude of the Jungfraujoch.

The intrinsic radioactive background of ultra-pure xenon gas (~2 kg), which had been stored underground in the Gran Sasso Underground Laboratory (LNGS, Italy) for more than one year, was measured with a high- purity Germanium detector. This facility is also installed underground at LNGS and is owned and operated by the UZH group. After the measurement, the xenon sample was brought up to the Jungfraujoch at the end of October 2012, where it is now continuously exposed to the increased cosmic ray flux.

We plan to activate the sample until spring 2013. Then it will be brought back to LNGS, transferred into a low-radioactivity steel bottle that was not exposed to cosmic rays, and measured again for radioactive impurities. The comparison of the two measurements, before and after activation, together with the neutron flux data from the research station Jungfraujoch, will allow us to quantify the potential activation of xenon due to the cosmic-ray induced reactions.

Key words:

Cosmogenic activation, low background physics

Collaborating partners/networks:

The results will be used for background predictions of the XENON dark matter experiment.

Address:

Physik Institut
Universität Zürich
Winterthurerstrasse 190
CH-8057 Zürich

Contacts:

Marc Schumann
Tel.: +41 44 635 6692
E-mail: marc.schumann@physik.uzh.ch
URL: http://www.physik.uzh.ch/groups/groupbaudis/darkmatter