

## First results of the EDELWEISS-II direct dark matter search experiment.

### Abstract

EDELWEISS is a direct dark matter search situated in the low radioactivity environment of the Modane Underground Laboratory (LSM). The experiment uses Ge detectors at very low temperature in order to identify eventual rare nuclear recoils induced by elastic scattering of WIMPs from our Galactic halo.

The second phase of the experiment (EDELWEISS-II) is presented with its new set-up for better shielding natural radioactivity from environment. In order to better understand the gamma background overwhelming the experience, a comparison between Monte Carlo simulations and experimental data for high energy gamma ray background has been performed with the "classical" Ge-NTD type detectors. In addition alpha and beta backgrounds have been investigated to figure out the  $^{210}\text{Pb}$  contamination due to Radon pollution of Germanium crystal.

A WIMP search analysis has been performed with an array of ten 400 g heat-and-ionization cryogenic detectors equipped with interleaved electrodes for the rejection of near-surface events (new Ge-ID type detector). Six months of continuous operation at LSM have been achieved. The observation of one nuclear recoil candidate above 20 keV in an effective exposure of 144 kgd is interpreted in terms of limits on the cross-section of spin-independent interactions of WIMPs and nucleons. A cross-section of  $1.0 \times 10^{-7}$  pb is excluded at 90%CL for a WIMP mass of 80 GeV/ $c^2$ . This result demonstrates for the first time the very high background rejection capabilities of these simple and robust detectors in an actual WIMP search experiment. The future prospects for this experiment are also discussed.