



Contribution ID: 276

Type: oral

The SABRE experiment: status and prospects

Tuesday, 24 September 2024 14:51 (17 minutes)

The SABRE experiment aims to find Dark Matter through the annual modulation in NaI(Tl) crystals' rate. The project is conceived as a double-site experiment, with two similar detectors located respectively in the North hemisphere (LNGS, Italy) and in the South hemisphere (SUPL, Australia), in order to disentangle seasonal or site-related effects and verify the cosmic nature of an eventual modulation signal.

The collaboration produced various test crystals in partnership with RMD Company (US) in the last ten years, which were measured and characterized underground at LNGS. In particular the NaI-33 crystal demonstrated a background rate of 1.20 ± 0.05 counts/day/kg/keV, the lowest ever reached with NaI(Tl) after DAMA/LIBRA. A zone refining (ZR) processing of the NaI powder in collaboration with Mellen company showed the possibility to reduce further K-40, Rb-87 and other important contaminants and is foreseen for the next generation crystals. This could lead to an expected rate of 0.5 cpd/kg/keV in the ROI.

Considering the limitations to use liquid scintillators at LNGS, and the reduction of veto-able backgrounds after ZR, SABRE North is proceeding to a full scale design with purely passive shielding made of copper and polyethylene. Instead, in the SABRE South design, the crystal matrix is immersed in a linear alkyl benzene (LAB) based liquid scintillator veto, further surrounded by passive steel and polyethylene shielding and a plastic scintillator muon veto.

This talk will report the status and prospects of SABRE for North and South facilities.

Primary author: D'IMPERIO, Giulia (Istituto Nazionale di Fisica Nucleare)

Presenter: D'IMPERIO, Giulia (Istituto Nazionale di Fisica Nucleare)

Session Classification: Direct Dark Matter detection