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The SoLid experiment at BR2

Friday, 8 July 2022 12:00 (15 minutes)

The SoLid experiment is currently taking physics data close to the BR2 reactor core (SCK·CEN, Belgium), exploring very short baseline anti-neutrino oscillations. It aims to provide a unique and complementary test of the reactor anti-neutrino anomaly by measuring both anti-neutrino rate and energy spectrum.
The 1.6 tons detector uses an innovative antineutrino detection technique based on a highly segmented target volume made of PVT cubes and LiF:ZnS phosphor screens. The combination of scintillator signals provides a unique signature in space and time to localise and identify the products of the inverse beta decay to face the high background environment imposed by operating at less than 10 meters from the reactor core without significant overburden.
In this contribution we will discuss the technology choices that were made to construct the SoLid experiment, the experience gained from its commissioning, calibration, and the detector performance characteristics during three years of non-stop operation. These years of detailed detector characterisation now allow the usage of more sophisticated reconstruction methods, that take better into account the detector's specificities. They will be presented alongside with a new calibration procedure, where the reconstruction of muons allows to measure all relevant detector parameters and where the energy reconstruction and the energy scale are constrained at all relevant scales by a set of calibration sources and control samples from real data (BiPo, and 12-B) until high energy with muons. The upgrade phase II of the SoLid experiment will be presented too.

In-person participation

Yes

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