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Status of the SABRE South Experiment at the Stawell Underground Physics Laboratory

The SABRE (Sodium iodide with Active Background REjection) experiments aim to detect an annual rate modulation from dark matter interactions in ultra-high purity NaI(Tl) crystals. The SABRE South experiment is located at the Stawell Underground Physics Laboratory (SUPL), Australia, and is the first deep underground laboratory in the Southern Hemisphere. SABRE South is designed to disentangle seasonal or site-related effects from the dark matter-like modulated signal first observed by DAMA/LIBRA in the Northern Hemisphere using an active veto and muon detection system. It is a partner to the SABRE North effort at the Laboratori Nazionali del Gran Sasso (LNGS).

SABRE South is instrumented with ultra-high purity NaI(Tl) crystals 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. Significant work has been undertaken to understand the experimental backgrounds and performance of the crystals. The SABRE South experiment is under construction, and will be commissioned from late 2021 to early 2022. We will present the final design of SABRE South, the status of its construction, its expected background, and its sensitivity to a DAMA/LIBRA like modulation. We will also present recent quenching factor measurements of sodium nuclear recoils in NaI(Tl) crystals measured at the Heavy Ion Accelerator Facility, and a report on the status of SUPL.

Primary experiment

SABRE South collaboration.

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Track Classification: Dark matter and other low-background experiments