

XVth Quark Confinement and the Hadron Spectrum



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The SABRE South Experiment at the Stawell Underground Physics Laboratory

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The SABRE experiment aims to detect an annual rate modulation from dark matter interactions in ultra-high purity NaI(Tl) crystals in order to provide a model independent test of the signal observed by DAMA/LIBRA. It is made up of two separate detectors that rely on joint crystal R&D activity; SABRE South located at the Stawell Underground Physics Laboratory (SUPL), in regional Victoria, Australia, and SABRE North at the Laboratori Nazionali del Gran Sasso (LNGS).

SABRE South is designed to disentangle seasonal or site-related effects from the dark matter-like modulated signal by using an active veto and muon detection system. Ultra-high purity NaI(Tl) crystals are 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 and mitigate the background processes, taking into account radiation from the detector materials, from both intrinsic and cosmogenic activated processes, and to understand the performance of both the crystal and veto systems.

SUPL is a newly built facility located 1024 m underground (~2900 m water equivalent) within the Stawell Gold Mine and its construction has been completed in 2023.

The commissioning of SABRE South started in early 2024 and the first equipment including the muon detectors have been already installed in SUPL.

This talk will report on the general status of the SABRE South assembly, its expected performance, and the design of SUPL.

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