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Direct search of Dark Matter through the SABRE South experiment

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The SABRE (Sodium-iodide with Active Background REjection) South experiment is a direct dark matter search detector, made of radio-pure NaI(Tl) crystals surrounded by a liquid scintillator veto. The achievement of ultra-low background rate is essential to provide a model independent test of the signal observed by the DAMA/LIBRA experiment whose claim has not been verified yet.

The SABRE South experiment will be located at the Stawell Underground Physics Laboratory (SUPL), Australia. SUPL is the first deep underground (1024 m) laboratory in the Southern Hemisphere, which is scheduled to be operational by mid-2022. The laboratory will not only house rare event physics searches, such as SABRE, but also measurement facilities to support low background physics experiments and applications like radiobiology and quantum computing.
The SABRE South detector assembly is planned to start once SUPL is finalised, and its commissioning is expected to occur in 2023.

The SABRE South NaI(Tl) crystal arrays will be immersed in a linear alkyl benzene (LAB) scintillator which acts as a veto by detecting signals through eighteen 8"R6912 Hamamatsu PMTs. Careful calibration studies must be set up in order to assess the PMT responses and the scintillator properties.

This talk will describe the SABRE South's location at SUPL, its final detector layout and its current status, and the calibration system design which will be implemented to test the veto PMTs.

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