

GALACTIC DARK MATTER SEARCH WITH THE SABRE DETECTOR

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Direct detection of dark matter is nuclear physics technology applied to a key problem in astroparticle physics. SABRE (Sodium-iodide with Active Background REjection) is a new NaI(Tl) experiment designed to search for galactic Dark Matter through the annual modulation signature. A Dark Matter signal on an Earth-based detector is expected to modulate yearly due to the change of the Earth's speed relative to the galactic halo reference frame. The long-standing result from the DAMA/LIBRA experiment at the Gran Sasso National Laboratory (LNGS) is consistent with this scenario.

SABRE will consist of highly pure NaI(Tl) crystals operated in an active liquid scintillator veto. The scintillator will provide a veto against external backgrounds and will allow us to tag the background arising from detector components, especially the 3 keV signature from the decay of ^{40}K in the crystal. An unprecedented radio-purity for both the NaI powder and the crystal growth is needed. SABRE will consist of two high-purity NaI(Tl) detector arrays located at LNGS and in the Stawell Underground Physics Lab under development in Victoria. The operation of twin full-scale experiments in both the northern and southern hemispheres will strengthen the reliability of the result against possible seasonal systematic effects.