

SABRE: A new NaI(Tl) dark matter direct detection experiment

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SABRE (Sodium-iodide with Active Background REjection) is a new NaI(Tl) experiment designed to test the DAMA/LIBRA claim for a positive WIMP-dark matter annual modulation signal. SABRE will consist of highly pure NaI(Tl) crystals in an active liquid scintillator veto that will be placed deep underground. The scintillator vessel will provide a veto against external backgrounds and those arising from detector components, especially the 3 keV signature from the decay of ^{40}K in the crystal. It will therefore allow for a sensitive measurement of the ^{40}K levels in the crystals as they are developed. Through the use of the veto and crystal purification techniques, we aim for a ^{40}K background 10 times lower than that of the DAMA/LIBRA experiment. We present our work developing low-background NaI(Tl) crystals with a highly pure NaI powder and the development of the veto technology.

Primary author: Mrs SHIELDS, Emily (Graduate Student)

Co-author: SABRE COLLABORATION, SABRE (Princeton University)

Presenter: Mrs SHIELDS, Emily (Graduate Student)

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