

HIGH SENSITIVITY CHARACTERIZATION OF A NAI(TL) SCINTILLATOR FOR DARK MATTER DIRECT SEARCH

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The progress in dark matter (DM) direct detection requires further experimentation and development of new facilities.

Besides the full completion of ongoing projects the ideas to repurpose present detectors for future DM direct searches for low mass WIMP scenarios are under considerations.

Fostering new facilities for a measurement of the model-independent annual modulation signature expected for DM particles is a major priority.

In this framework, I present new results on the radio-purity of a NaI(Tl) 3.4 kg scintillator with the SABRE proof-of-principle detector.

This represents a benchmark for the development of next-generation detectors with a NaI(Tl) array for the direct search of the annual modulation.

The crystal has an unprecedented potassium radio-purity, tested by direct counting and a background rate in the energy region of interest comparable with DAMA/LIBRA.

I shall also discuss further developments based on quantitative data from zone refining purification which makes feasible the possibility to reach radio-purity levels beyond DAMA/LIBRA.

