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Study of high-purity NaI(Tl) crystals using the PICOLON purification method.

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Dark Matter Detection is an important issue in both cosmology and particle physics. WIMPs (Weakly Interacting Massive Particles) are one of the most promising candidates for dark matter and are being studied worldwide. The XENON group has the most sensitive detector in the world.

On the other hand, the DAMA/LIBRA group reports the annual modulation using NaI(Tl) with lower sensitivity than the XENON group. Hence verification is essential. Moreover, verification of the annual modulation of the DAMA/LIBRA group requires NaI(Tl) crystals with backgrounds comparable to those of the DAMA/LIBRA group.

PICOLON (Pure Inorganic Crystal Observatory for Low-energy Neut(ra)lino) aims to use ultra-pure NaI(Tl) crystals to search for dark matter and to verify the annual modulation reported by the DAMA/LIBRA group. In the 2020 report, crystals (Ingot#85) with backgrounds concentration comparable to DAMA/LIBRA were developed. In this presentation, we report the background and sensitivity of a new PICOLON crystal (Ingot#94) developed using the Ingot#85 purification method.

Submitted on behalf of a Collaboration?

Yes

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