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Results from ANAIS-112

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The evidence for the existence of dark matter from astrophysical observations is irrefutable. However, there has not been a conclusive direct detection of dark matter that does not rely on gravitational interaction with visible matter. One experiment, DAMA/LIBRA, claimed to have observed an annual modulation signal in a sodium-iodide-based detector consistent with that expected from dark matter which persisted for over two decades.

The ANAIS (Annual modulation with NaI(Tl) Scintillators) experiment, housed in LSC, is intended to directly test this claim by searching for the dark matter annual modulation with ultrapure NaI(Tl) scintillators. These efforts provide a model independent confirmation or refutation of the DAMA/LIBRA signal by using the same experimental target. Since data taking began in August 2017 and has been continuing smoothly, data for six years of exposure show consistency with the no modulation hypothesis to ~4σ. Additionally, the impact of different scintillation quenching factors, the main systematics in the comparison with the DAMA/LIBRA results, has also been investigated. Finally, there has been a further exclusion of the DAMA results by the combined annual modulation search for dark matter with the COSINE-100 experiment, located in South Korea.

This talk will present the most recent results of the ANAIS-112 dark matter search, our incorporation of the quenching factor in our comparison with DAMA/LIBRA, and our joint dark matter search with the COSINE-100 collaboration.

Abstract

(See content box)

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