

Dark Matter Annual Modulation Search in COSINE-100 Full Dataset and Beyond

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The event rate from dark matter interactions is expected to exhibit annual modulation due to their halo-shaped galactic distribution. However, this signature has only been conclusively observed in the reports by DAMA, which utilized NaI(Tl) scintillators. Although their claim could be interpreted as dark matter scattering, other experiments have yet to replicate it using different scintillation materials. To address this puzzle, the COSINE-100 experiment, employing 106 kg of the same material, NaI(Tl), was established as a direct and model-independent test of the DAMA result. Operating from September 2016 to March 2023 at the Y2L underground laboratory in South Korea, COSINE-100 collected optimal data for testing DAMA's findings. This presentation will share recent results from the annual modulation analysis of the COSINE-100 full dataset. Various additional physics searches have also been conducted, and these findings will be discussed. COSINE-100 completed its initial mission phase last year and is now undergoing upgrades to become COSINE-100U. At its new, deeper home in Yemilab, it will continue the dark matter search campaign with enhanced encapsulation techniques. The talk will provide the status and prospects of the upgrade program, along with plans for the next-generation experiment, COSINE-200.

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