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Recent Advances of Dark Matter Search from COSINE-100

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The Standard Halo Model predicts that dark matter detection on Earth should exhibit annual modulation. The DAMA/LIBRA experiment, utilizing NaI(Tl) crystal detectors, reported detecting an annual modulation signal that aligns with dark matter characteristics, achieving a significance of over 13 sigma. However, this result has not been replicated by any other experiment. To directly test DAMA/LIBRA's controversial claim, the COSINE-100 experiment was launched at the YangYang Underground Laboratory (Y2L) in Korea. Using 106 kg of NaI(Tl) crystals, COSINE-100 aims to scrutinize DAMA/LIBRA's findings through model-independent and model-dependent analyses. Operational from September 2016 to March 2023, COSINE-100 has amassed approximately six years of data. This presentation will detail the latest results from COSINE-100 and outline the planned upgrades to COSINE-100U, which include enhanced detector capabilities and relocation to a new site at Yemilab, Korea. The new encapsulation method and improved operational environment are designed to increase the sensitivity of dark matter detection. Further prospects of COSINE-100U will also be discussed.

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