

# Search for Dark Sector Particles at a Nuclear Reactor from the NEON Experiment

*Wednesday 27 August 2025 15:20 (20 minutes)*

The NEON experiment, located 23.7 meters from the Hanbit nuclear reactor core in Korea, offers a powerful platform to explore dark sector particles using the intense MeV-scale photon flux from a commercial reactor. In this talk, we present results from searches for axion-like particles (ALPs) and light dark matter (LDM) using 1.2 years of data collected with six NaI(Tl) scintillation detectors. The ALP analysis probes the cosmologically motivated “triangle” region in parameter space for the first time using a reactor-based experiment, setting new limits on ALP-photon and ALP-electron couplings in the MeV mass range. In parallel, our LDM search investigates dark photon-mediated LDM production in the reactor core and subsequent scattering off electrons in the detector, extending experimental sensitivity down to dark matter masses of 1 keV and providing the first laboratory-based constraints below 100 keV. These results highlight the unique potential of reactor experiments to probe light dark sector particles in previously inaccessible regions, offering a complementary approach to astrophysical and accelerator-based searches.

## Collaboration you are representing

NEON

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