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Searching for Dark Sector Particles in the NEON Experiment at a Reactor Facility

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The NEON (Neutrino Elastic-scattering Observation with NaI) experiment at the Hanbit nuclear power plant in Yeonggwang uses an array of NaI(Tl) crystals to search coherent elastic neutrino-nucleus scattering (CEvNS) with reactor anti-electron neutrinos. The experiment features a 16.7 kg NaI(Tl) target mass situated 23.7 meters from the reactor core and has collected physics data over a 24-month period. Beyond CEvNS, NEON is designed to investigate dark sector particles that are emitted by high-energy photons (MeV scale) from the reactor core. This includes searches for dark photons and axion-like particles (ALPs), both theorized to be in the similar MeV or lower mass range. In this presentation, I will discuss our recent efforts and findings in searching for these dark sector particles through the NEON experiment.

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