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Searching for MeV-scale Axion-like Particles and Dark Photons with PandaX-4T

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Axion-like particles (ALPs) and dark photons (DPs) are viable dark matter particle candidates that multiple underground experiments have investigated. We have searched for possible ALP/DP signals in the PandaX-4T liquid xenon detector using 94.8 days of data. A binned likelihood fit is constructed to scan for possible mono-energetic peaks induced by the absorption processes between ALPs/DPs and atomic electrons of xenon. A detailed temporal model of decays associated with xenon isotopes is introduced to constrain the number of background events. No signal excess over background expectations is observed, and we have established the most stringent exclusion limits for most ALP/DP masses ranging from 150 keV/c^2 to 1 MeV/c^2.

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