The Heavy Photon Search Experiment at Jefferson Laboratory

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Abstract

The Heavy Photon Search (HPS) is a new experiment at Jefferson Lab that will search for massive U(1) vector bosons (also known as heavy photons, dark photons, or A') of mass 20–1000 MeV that couple to electric charge with relative coupling α'/α of 10^{-5}–10^{-10}. The HPS experiment is designed to produce heavy photons by electron scattering off a fixed target, and detect them using two decay channels (e^+e^- or $\mu^+\mu^-$ pairs) and two signatures (invariant mass resonance and displaced decay vertex). The detector is a compact, large-acceptance forward spectrometer comprising a silicon microstrip tracker for momentum measurement and vertexing, an electromagnetic calorimeter for triggering on e^+e^-, and a muon detector for triggering on $\mu^+\mu^-$. This talk will cover the motivations for heavy photons and give an overview of the HPS experiment.