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The Heavy Photon Search Experiment at Jefferson Lab

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The Heavy Photon Search (HPS) is a new experiment at Jefferson Lab which will search for heavy $U(1)$ vector bosons (heavy/dark photons) in the mass range of 20 MeV/c^2 to 1 GeV/c^2. Dark photons in this mass range are theoretically favorable and may mediate dark matter interactions. The dark photon couples to electric charge through kinetic mixing with the photon, allowing its production through a process analogous to bremsstrahlung radiation. HPS will utilize this production mechanism to probe dark photons with relative couplings of $\alpha'/\alpha \sim 10^{-5}$ to 10^{-10} and search for the e^+e^- or $\mu^+\mu^-$ decay of the dark photon via two signatures (invariant mass and displaced vertex). Using Jefferson Lab's high luminosity electron beam along with a compact large acceptance forward spectrometer consisting of a silicon vertex tracker, lead tungstate electromagnetic calorimeter and a muon detector, HPS will access hitherto unexplored regions in the mass/coupling space. This talk will review the motivations driving the searches for dark photons and give an overview of the HPS experiment.

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