

# Heavy Photon Search

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The Heavy Photon Search (HPS) experiment at Jefferson Lab is searching for a new  $U(1)$  vector boson (“heavy photon”, “dark photon” or  $A'$ ) in the mass range of 20-500 MeV/ $c^2$ . An  $A'$  in this mass range is theoretically favorable and may also mediate dark matter interactions. The  $A'$  couples to the ordinary photon through kinetic mixing, which induces their coupling to electric charge. Since heavy photons couple to electrons, they can be produced through a process analogous to bremsstrahlung, subsequently decaying to an  $e^+e^-$ , which can be observed as a narrow resonance above the dominant QED trident background. For suitably small couplings, heavy photons travel detectable distances before decaying, providing a second signature. Using the CEBAF electron beam at Jefferson Lab incident on a thin tungsten target, along with a compact, large acceptance forward spectrometer consisting of a silicon vertex tracker and lead tungstate electromagnetic calorimeter, HPS is accessing unexplored regions in the mass-coupling phase space.

The HPS engineering runs took place in spring of 2015 using a 1.056 GeV beam and in winter of 2016 using a 2.3 GeV beam. This talk will present an overview of the HPS experiment and discuss the latest results.