

Abstract Submitted
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Resonance Search for a Heavy Photon in the 2015 Engineering Run Data of the Heavy Photon Search Experiment OMAR MORENO, SLAC National Accelerator Laboratory, HEAVY PHOTON SEARCH COLLABORATION — 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 run took place in spring of 2015 using a 1.056 GeV, 50 nA beam and collected 1165 nb $^{-1}$ (7.29 mC) of data. This talk will present the results of a resonance search for a heavy photon using the engineering run data.

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