

Search for a Dark Photon with the Heavy Photon Search Experiment

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The Heavy Photon Search experiment took its first data in a 2015 engineering run using a 1.056 GeV, 50 nA electron beam provided by CEBAF at the Thomas Jefferson National Accelerator Facility, searching for an electro-produced dark photon. Using 1.7 days (1170 nb^{-1}) of data, a search for a resonance in the e^+e^- invariant mass distribution between 19 and 81 MeV/ c^2 showed no evidence of dark photon decays above the large QED background, confirming earlier searches and demonstrating the full functionality of the experiment. Upper limits on the square of the coupling of the dark photon to the Standard Model photon are set at the level of 6×10^{-6} . In addition, a search for displaced dark photon decays did not rule out any territory but resulted in a reliable analysis procedure that will probe hitherto unexplored parameter space with future, higher luminosity runs. Results from both the 2015 resonance and displaced dark photon searches will be presented as well as plans for future data analysis and running.

Session

Thesis Presentations (30+10 min)

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Session Classification: Thesis Presentations