Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Searching for heavy photons at Jefferson Lab using detached vertices LAWRENCE WEINSTEIN, HOLLY SZUMILA-VANCE, Old Dominion University, HPS COLLABORATION COLLABORATION — The Heavy Photon Search (HPS) experiment in Jefferson Lab Hall B will look for a new U(1) vector boson (called a "heavy photon", "dark photon", or A') in the mass range from 20 to 600 MeV/c^2. This A' could potentially couple to the ordinary photon through kinetic mixing, which would create a coupling to electric charge of $\alpha'/\alpha = \epsilon^2$. If so, then the A' can be produced through electron interactions with a heavy target through a process analogous to bremsstrahlung. The A' could then decay to e^+e^-. If the coupling ϵ is large, we can directly detect a peak in the e^+e^- mass spectrum above the dominant QED background. If $\epsilon$is small, then we can look for e^+e^- events with a detached vertex resulting from A' decays downstream of the production target. In 2015 and 2016 we measured a few beam days each of 1.1 and 2.2 GeV electron scattering from tungsten using a large acceptance forward spectrometer consisting of a silicon vertex tracker located inside a dipole magnet and a lead tungstate electromagnetic calorimeter for triggering. This talk will present the detached vertex A' search, including preliminary results at 1.1 GeV if available.

Lawrence Weinstein
Old Dominion University

Date submitted: 30 Sep 2016 Electronic form version 1.4