

Abstract Submitted  
for the APR12 Meeting of  
The American Physical Society

**New experimental results for a vector boson** A BOGDAN WOJTSEKHOWSKI, Thomas Jefferson National Accelerator Facility, ROUVEN ESSIG, SUNY at Stony Brook, PHILIP SCHUSTER, NATALIA TORO, Perimeter Institute at Canada — The search for a new vector boson,  $A'$ , in the test run of  $A'$  EXperiment (APEX) results in a limit for a weak coupling  $\alpha' \gtrsim 10^{-6}\alpha$  to electrons ( $\alpha = e^2/4\pi$ ) in the mass range  $175 \text{ MeV} < m_{A'} < 250 \text{ MeV}$ . New vector bosons with such small couplings arise naturally from a small kinetic mixing of the “dark photon”  $A'$  with the photon — one of the very few ways in which new forces can couple to the Standard Model — and have received considerable attention as an explanation of various dark matter related anomalies.  $A'$  bosons are produced by radiation off an electron beam, and could appear as narrow resonances with small production cross-section in the trident  $e^+e^-$  spectrum. We plan to search for the  $A'$  by using the CEBAF electron beam at energies of  $\approx 1\text{--}4 \text{ GeV}$  incident on  $0.5\text{--}10\%$  radiation length multi-foil Tungsten targets, and measure the resulting  $e^+e^-$  pairs using the High Resolution Spectrometers and a septum magnet in Hall A at Jefferson Lab. With a 33-day run, the experiment will achieve very good sensitivity because the statistics of  $e^+e^-$  pairs will be  $\sim 10,000$  times larger in the explored mass range than in any previous search for the  $A'$  boson. This talk will discuss the experiment and present the

Bogdan Wojtsekhowski  
Thomas Jefferson National Accelerator Facility

Date submitted: 10 Jan 2012

Electronic form version 1.4