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Dark Matter Searches using a Free-Electron Laser (FEL) JAMES R. BOYCE, Jefferson Lab, A. AFANASEV, Hampton Univ., O.K. BAKER, Yale Univ., K.B. BEARD, Muons, Inc., G. BIALLAS, Jefferson Lab, M. MINARNI, Yale Univ., R. RAMDON, Hampton Univ., M. SHINN, Jefferson Lab., P. SLOCUM, Yale Univ., LIPSS COLLABORATION[1] — Photon coupling to light neutral bosons in the meV mass range has been predicted and searched for by several international collaborations. Using the "light shining through a wall" technique, light from Jefferson Lab's high average power Free-Electron Laser (FEL) was passed through a strong magnetic field upstream of an optical beam dump; regenerated photons were then searched for downstream of a second magnetic field region optically shielded from the former. While our initial results show no evidence for scalar coupling in this region of parameter space, the results establish new coupling boundaries. New constraints on the hypothetical para-photon particles were also obtained. We describe the experimental setup, the initial scalar boson results, and proposed experiments that include searching for para-photons and chameleon particles. Notice: Authored by Jefferson Science Associates, LLC under U.S. DOE Contract No. DE-AC05-06OR23177. The U.S. Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce this manuscript for U.S. Government purposes.

[1]LIght Pseudo-scalar and Scalar Search

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