Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Tensor coupling limits from β decay KEVIN HICKERSON, University of California Los Angeles — The recent discovery of B-modes in the cosmic microwave background by BICEP2 strongly implies that the Standard Model needs to be extended to include tensor currents, at least near the Planck scale. In addition, collisionless cold dark matter models may need to be modified to include beyond the Standard Model (BSM) collisions mediated by scalar or tensor couplings. So far, superallowed $0+ \to 0+$ nuclear β decay experiments have provided the tightest limits on scalar couplings near the TeV scale by analyzing the so-called, Fermi Fierz interference term, b_{F}. The tensor coupling constant, C_T, however, can be recovered from free neutron decay parameters extracted from recent experiments, improved in part, by using ultracold neutrons (UCN). In this talk, we present our new result for limits on BSM tensors couplings using a combined fit from neutron parameters, which include mixtures from Gamow–Teller Fierz interference, b_{GT}, and existing scalar limits. We show $-0.0026 < C_T/C_A < 0.0024$ (95% C.L.). We further discus limits on neutron Fierz interference from Big Bang Nucleosynthesis as well as current efforts to measure it directly.

Kevin Hickerson
University of California Los Angeles

Date submitted: 01 Jul 2014 Electronic form version 1.4