

Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Search for right-handed currents in the β^+ decay of laser-cooled, polarized ^{37}K D. MELCONIAN, A. GORELOV, Simon Fraser University, J.A. BEHR, K.P. JACKSON, TRIUMF, D. ASHERY, O. AVIV, Tel Aviv University, S. GU, M.R. PEARSON, University of British Columbia, W.P. ALFORD, University of Western Ontario, S. FOSTNER, University of Guelph — We have finished analyzing a measurement of the neutrino asymmetry parameter of the decay of polarized ^{37}K , which is sensitive to physics outside of the Standard Model. The atom cloud, initially cooled and confined by a magneto-optic trap, was optically pumped to achieve $(96.5 \pm 0.7)\%$ nuclear polarization. We non-destructively monitored this polarization and the cloud characteristics using a novel photoionization technique. The observed recoil asymmetry, directly related to the neutrino asymmetry, yielded $B_\nu = -0.771 \pm 0.020(\text{stat}) \pm 0.011(\text{syst})$. This initial measurement — the first in a system other than the neutron — is in agreement with the Standard Model prediction of $-0.7692(13)$. In the manifest left-right symmetric model, this limits the mass of a possible right-handed boson to be $\gtrsim 180 \text{ GeV}/c^2$ (90% CL). Though this is not yet competitive with limits from other nuclear, neutron and μ decay experiments, systematics of this first measurement have been identified and can be reduced. Modest improvements of this method will reach an accuracy of $< 0.5\%$, at which point it becomes complementary to other experiments. Supported by NSERC, NRC through TRIUMF, and CIPI.

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Date submitted: 18 Aug 2005

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