

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Time reversal violation in radiative beta decay: experimental plans¹ J.A. BEHR, TRIUMF, J. MCNEIL, U. British Columbia, M. ANHOLM, U. Manitoba, A. GORELOV, TRIUMF, D. MELCONIAN, TAMU, D. ASHERY, Tel Aviv U. — Some explanations for the excess of matter over antimatter in the universe involve sources of time reversal violation (TRV) in addition to the one known in the standard model of particle physics. We plan to search for TRV in a correlation between the momenta of the beta, neutrino, and the radiative gamma sometimes emitted in nuclear beta decay. Correlations involving three (out of four) momenta are sensitive at lowest order to different TRV physics than observables involving spin, such as electric dipole moments and spin-polarized beta decay correlations. Such experiments have been done in radiative kaon decay, but not in systems involving the lightest generation of quarks. An explicit low-energy physics model being tested [Gardner and He, Phys. Rev. D 87 116012 (2013)] produces TRV effects in the Fermi beta decay of the neutron, tritium, or some positron-decaying isotopes. We will present plans to measure the TRV asymmetry in radiative beta decay of laser-trapped ^{38m}K at better than 0.01 sensitivity, including suppression of background from positron annihilation.

¹Supported by NSERC, D.O.E., Israel Science Foundation. TRIUMF receives federal funding via a contribution agreement with the National Research Council of Canada

J.A. Behr
TRIUMF

Date submitted: 30 Sep 2016

Electronic form version 1.4