Abstract Submitted
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Time reversal violation in radiative beta decay[1] J.A. BEHR, TRIUMF, J. MCNEIL, Dept. of Physics and Astronomy, U. British Columbia, M. ANHOLM, Dept. of Physics and Astronomy, U. Manitoba, A. GORELOV, TRIUMF, B. FENKER, D. MELCONIAN, Cyclotron Institute and Dept. of Physics and Astronomy, Texas A&M U., D. ASHERY, School of Physics and Astronomy, 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 momenta are sensitive at lowest order to different TRV physics than observables involving spin, such as electric dipole moments. Similar experiments have been done in radiative kaon decay, but not in systems involving the lightest generation of quarks. The explicit low-energy physics model being tested [Gardner and He, Phys. Rev. D 87 116012 (2013)] produces effects in the Fermi beta decay of the neutron, tritium, and some positron-decaying isotopes. We will try to measure the TRV asymmetry in radiative beta decay of laser-trapped ^{38m}K at better than 0.01 sensitivity, and we will describe solutions to measure radiative gammas in the presence of background from positron annihilation.

[1]NSERC, NRC through TRIUMF

J.A. Behr
TRIUMF

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