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Time-reversal test in radiative beta decay: progress[1] J.A. BEHR, A. GORELOV, TRIUMF, J.C. MCNEIL, U. British Columbia, D. MELCONIAN, Texas AM, M. ANHOLM, G. GWINNER, U. Manitoba, T. VALENCICT, Caltech, A. AFANASSIEVA, McMaster University — We are developing a time-reversal breaking test in radiative beta decay, using just the momenta of three outgoing particles. This type of time reversal is independent of nuclear spin, so explores time reversal-breaking physics unrelated to electric dipole moments, though there are model-dependent constraints at 1-loop order from null measurements of EDM's. The scalar triple product of three momenta provides a unique time-reversal odd observable, but trivially vanishes in ordinary beta decay when the three momenta sum to zero. So we need the fourth outgoing particle in radiative beta decay, considering the correlation between beta, neutrino, and gamma. We add gamma-ray detectors to TRIUMF's MOT for beta decay, which includes a COLTRIMS-like electrostatic field for recoil ion detection. Explicit models produce this observable with an antisymmetric Chern-Simons term from QCD-like new interactions, combined with the vector electroweak interactions within the nucleon [S. Gardner and D. He, Phys. Rev. D 87 116012 (2013)], and among the predicted features are a quite different gamma-ray spectrum than normal bremsstrahlung. We will show initial data from the decay of ^{92}Rb, a case without vector interactions not yet testing the explicit models.

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John Behr
TRIUMF

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