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A T-odd Momentum Correlation in Radiative Beta Decay SUSAN GARDNER, DAHENG HE, University of Kentucky — A triple-product momentum correlation in the neutron or nuclear radiative β-decay rate isolates the pseudo-Chern-Simons term found by Harvey, Hill, and Hill as a consequence of the baryon vector current anomaly and $\mathrm{SU}(2)_L \times \mathrm{U}(1)_Y$ gauge invariance at low energies. The correlation appears if the imaginary part of the coupling constant is nonzero, so that its observation potentially probes sources of CP violation beyond the Standard Model. The effect can be mimicked by electromagnetic final-state interactions in the Standard Model; we have computed the induced T-odd triple-momentum correlation in the decay rate in $\mathcal{O}(\alpha)$ in the absence of recoil effects. We retain the parametric dependence on masses and coupling constants throughout so that our results serve as a template for the evaluation of the asymmetry in allowed nuclear radiative β-decays as well. We discuss the role nuclear processes can play in discovering the effect.

Susan Gardner
University of Kentucky

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