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Analysis of hadronic parity violation in the context of beyond the standard model physics using results from the NPDGamma collaboration[1] CHRIS HADDOCK, Indiana University — Various theories beyond the Standard Model predict new particles with masses in the sub-eV range that couple very weakly to ordinary matter. A parity-odd interaction between polarized nucleons and unpolarized matter equal to $\frac{g_A g_V}{2\pi}\frac{e^{-r/\lambda}}{r}\vec{s}\cdot\vec{v}$ is one such possibility(B. Dobrescu and I. Mocioiu, 2006), where $\vec{s}$ and $\vec{v}$ are the spin and velocity of the polarized nucleon, r is the separation between the nucleon and unpolarized matter, λ is the interaction range, and g_A and g_V are the axial and vector couplings of an interaction induced by the exchange of a new light vector boson. We analyze how the presence of such an interaction would manifest itself in the parity violating up-down asymmetry A_γ with respect to the neutron spin direction of γ rays emitted in the reaction $\vec{n}+p\rightarrow d+\gamma$ measured by the NPDGamma Collaboration (M.T. Gericke et al., 2011). The result from this experiment in combination with some assumptions about the Standard Model hadronic weak interaction can be used to set model-independent constraints on the product $g_A^n g_V^p$ for interaction ranges large compared to the nucleon size.

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