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Why Right-Handed Neutrinos Do Not Exist ROBERT CLOSE — Ever since the discovery that weak interactions are preferentially left-handed, physicists have sought an explanation as to why certain mirror phenomena, such as right-handed neutrinos, are never observed. One possibility is that the theoretical parity operator which predicts such mirror phenomena is incorrect. We examine the conventional derivation of the Dirac parity operator and find that it is based on a speculative relativistic argument unrelated to Lorentz invariance. An illusory functional dependence of the probability density ($\bar{\psi}\gamma^0\psi = \psi^\dagger\psi$) on the matrix γ^0 incorrectly requires that γ^0 preserve its sign under spatial reflection. The resulting parity operator P yields a mixed-parity vector space, defined relative to velocity, which is otherwise isomorphic to the spatial axes. We derive a new spatial reflection operator M (for mirroring) by requiring that for any set of orthogonal basis vectors, all three have the same parity. The M operator is a symmetry of the Dirac equation. It exchanges matter and antimatter eigenfunctions, consistent with all experimental evidence of mirror symmetry between matter and antimatter. This result provides a simple and compelling reason for the lack of mirror-like phenomena which do not exchange matter and antimatter.

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