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Mirror Symmetry of Matter and Antimatter ROBERT CLOSE, Clark College — Physical processes involving weak interactions have mirror images which can be mimicked in the natural universe only by exchanging matter and antimatter. This experimental observation is easily explained by the hypothesis that spatial inversion exchanges matter and antimatter. Yet according to conventional theory, the parity operator P does not exchange matter and antimatter but instead yields phenomena which have never been observed. We examine the conventional derivation of the Dirac parity operator and find that it is based on the speculative assumption that the unit imaginary is always a true scalar rather than a pseudoscalar. This assumption incorrectly requires that the matrix γ^0 preserve its sign under spatial inversion. This requirement results in a mixed-parity vector space defined relative to velocity, which is otherwise isomorphic to the spatial axes. We derive a new spatial inversion operator M (for mirroring) by requiring that for any set of orthogonal basis vectors, all three must have the same parity. A pseudoscalar unit imaginary is defined in terms of Dirac matrices. The M operator is a symmetry of the Dirac equation. It exchanges positive and negative energy eigenfunctions, consistent with all experimental evidence of mirror symmetry between matter and antimatter. This result provides a simple reason for the apparent absence in nature of mirror-like phenomena, such as right-handed neutrinos, which do not exchange matter and antimatter.

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