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C and CP violation from mirror-symmetry breaking in the $\eta \to \pi^+\pi^-\pi^0$ Dalitz plot JUN SHI, SUSAN GARDNER, Univ of Kentucky — The CP-violating effects observed thus far appear in flavor-changing processes and in a manner more or less consistent with the predictions of the Standard Model (SM). However, it has long been thought that the observed size of the cosmic baryon asymmetry suggests that mechanisms of CP violation beyond the CKM paradigm should exist. Permanent electric dipole moment searches are exquisite probes of new sources of P and CP violation, whereas processes that would break C and CP are not well studied. The decay $\eta \to \pi^+\pi^-\pi^0$ is an ideal process in which to search for flavor-diagonal C and CP violation. The patterns of C and CP violation that could emerge from an observed violation of mirror symmetry in the Dalitz plot distribution of $\eta \to \pi^+\pi^-\pi^0$ decay would speak to patterns of new physics as well. In particular, the isospin of the underlying C- and CP-violating structures can be reconstructed from their kinematic representation in the Dalitz plot. Our analysis of recent KLOE-2 data reveals that the C- and CP-violating amplitude with total isospin $I = 2$ is much more severely suppressed than that with total isospin $I = 0$. We conclude with a discussion of the constraints on possible new C- and CP-odd operators as derived from SM effective field theory.

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