

Abstract Submitted
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Hamiltonians for Color in the Standard Model and Implications

RICHARD HOLMES, The Boeing Company — A set of six 3x3 Hamiltonian matrices are identified that have eigenstates that correspond to the conventional three color and three anti-color states of QCD. Application of these matrices to the up and down quark families yields three and only three generations of flavors; and eigenvalues that accurately match the measured or inferred masses of the three flavors of particles of each quark. The eigenstates are shown to have the same properties as the color states in QCD. The 3 degenerate mass eigenstates per flavor permit a unique and accurate fit of the CKM matrix, and a physical rationale is provided. These matrices can also be applied to the lepton families, resulting in (a) an accurate match of the measured or inferred masses of the leptons; (b) an orderly pattern of the matching free parameters of the Hamiltonians for all four families of fundamental fermions; and (c) an interpretation of neutrino oscillations as superpositions of eigenstates of the Hamiltonians, and (d) a unique and accurate fit of the PMNS matrix. The theory supports pure-mass Dirac states for the electron family. Upon integration of the Hamiltonians with the Dirac equation, one finds equations invariant under TCP, Lorentz, SU(1), and SU(2)L, and SU(3) transformations. Remaining issues are discussed.

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