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Reduction of N=1, E8 SYM over SU(3)/U(1)xU(1)xZ3 and its four-dimensional effective action

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We propose an extension of the Standard Model inspired by the E_8 x E_8 Heterotic String. In order that a reasonable effective Lagrangian is presented we neglect everything else other than the ten-dimensional N=1 supersymmetric Yang-Mills sector associated with one of the gauge factors and certain couplings necessary for anomaly cancellation. We consider a compactified space-time M_4 x B_0/Z_3, where B_0 is the nearly Kaehler manifold SU(3)/U(1) x U(1) and Z_3 is a freely acting discrete group on B_0. Then we reduce dimensionally the E_8 on this manifold and we employ the Wilson flux mechanism leading in four dimensions to an SU(3)^3 gauge theory with the spectrum of a N=1 supersymmetric theory. We compute the effective four-dimensional Lagrangian and demonstrate that an extension of the Standard Model is obtained with interesting features including a conserved baryon number and fixed tree level Yukawa couplings and scalar potential. The spectrum contains new states such as right handed neutrinos and heavy vector-like quarks.

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