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Effects of a potential fourth fermion generation on the upper and lower Higgs boson mass bounds

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We study the effect of a potential fourth fermion generation on the upper and lower Higgs boson mass bounds. This investigation is based on the numerical evaluation of a chirally invariant lattice Higgs-Yukawa model emulating the same Higgs-fermion coupling structure as in the Higgs sector of the electroweak Standard Model. In particular, the considered model obeys a Ginsparg-Wilson version of the underlying SU(2)_L x U(1)_Y symmetry, being a global symmetry here due to the neglection of gauge fields in this model. Here we present our first results on the fermion mass dependence of the Higgs boson mass bound as well as its cutoff dependence at very heavy fermion masses.

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