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Light states in real multi-Higgs models with spontaneous CP violation (24+6)

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In models with extended scalar sectors consisting of multiple Higgs doublets that trigger spontaneous electroweak symmetry breaking, it might be expected that the abundance of dimensionful quadratic couplings in the scalar potential could allow for a regime where, apart from the would-be Goldstone bosons and a neutral Higgs-like state, all new scalars have masses much larger than the electroweak scale. In the case of models where CP invariance holds at the lagrangian level but is
broken by the vacuum, we show that such a reasonable expectation does not hold. When perturbativity requirements are placed on the dimensionless quartic couplings, the spectrum of the new scalars includes one charged and two additional neutral states whose masses cannot be much larger than the electroweak scale

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