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Spontaneous SUSY breaking in natural SO(10) GUT

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In natural GUT, various problems in SUSY GUT, including the doublet-triplet splitting problem, can be solved with a natural assumption in which all interactions (incl. higher dimensional interactions) which are allowed by the symmetry are introduced with $O(1)$ coefficients. In the models, the Fayet-Iliopoulos (FI) term plays an important role. The FI term can also play an critical role in breaking SUSY spontaneously. Surprisingly, if the number of singlets is reduced by one from a natural GUT, then spontaneous SUSY breaking can be realized in the natural GUT. Unfortunately, it had been considered that because of the approximate $U(1)_R$ symmetry, the induced gaugino mass becomes much smaller than the sfermion masses. However, as discussed in the paper (arXiv:1712.05107), when SUGRA effects are considered, the gaugino masses can be larger because maximal $U(1)_R$ breaking, the constant term in the superpotential, can give larger masses to the gauginos in SUGRA. In this talk, we consider spontaneous SUSY breaking in an explicit natural $SO(10)$ GUT and discuss the phenomenology of the predicted light particles and SUSY breaking parameters.

Parallel Session

Supersymmetry: Models, Phenomenology and Experimental Results

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