The Electroweak Sector of the pMSSM in the Light of LHC - 8 TeV and Other Data

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Abstract

Using the chargino-neutralino and slepton search results from the LHC in conjunction with the WMAP/PLANCK and $(g - 2)_\mu$ data, we constrain several generic pMSSM models with decoupled strongly interacting sparticles, heavier Higgs bosons and characterized by different hierarchies among the EW sparticles. We find that some of them are already under pressure and this number increases if bounds from direct detection experiments like LUX are taken into account, keeping in mind the associated uncertainties. The XENON1T experiment is likely to scrutinize the remaining models closely. Analysing models with heavy squarks, a light gluino along with widely different EW sectors, we show that the limits on $m_{\tilde{g}}$ are not likely to be below 1.1 TeV, if a multichannel analysis of the LHC data is performed. Using this light gluino scenario we further illustrate that in future LHC experiments the models with different EW sectors can be distinguished from each other by the relative sizes of the $n$-leptons + $m$-jets + $E_T$ signals for different choices of $n.$