Well-tempered Bino-Wino Dark Matter
and Proton Decay

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Abstract

In the minimal supersymmetric $SU(5)$ grand unification theory, we study a correlation between the mass of well-tempered Bino-Wino dark matter and the rate of $p \to K^+\bar{\nu}$ decay induced by the colored Higgs. We consider mass spectra with (gaugino masses) $\ll$ (sfermion masses) $\sim |\mu|$, and assume either that (1) anomaly mediation is responsible for gaugino masses while gravity mediation is for sfermion masses or that (2) 'no-scale' structure is implemented and gravity mediation is responsible for both. Proximity of Bino and Wino masses is realized by radiative corrections proportional to $\mu$-term. The mass of dark matter with the correct relic abundance is related to the Bino-Wino mass difference, and hence to $\mu$-term, and this $\mu$-term is linked to the colored Higgs mass by the condition of gauge coupling unification. Hence, the dark matter mass is correlated with $p \to K^+\bar{\nu}$ decay rate.