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Supersymmetric grand unified theories with Higgsino-like neutralino dark matter and its implication to the proton decay search at the Hyper-Kamiokande

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Imposing the gauge coupling unification and the Higgsino-like neutralino dark matter in our Universe, we perform a parameter scan for a simple parameter set in the Minimal Supersymmetric Standard Model, namely, the universal sfermion mass (m_0) and the universal gaugino mass at the GUT scale (M). We find that sparticle masses in the range of 10-100 TeV result in the lifetime of proton decay mediated by the GUT gauge bosons that can be tested in the Hyper-Kamiokande experiment in the near future.

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