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Testing the bulk matter RS model through flavor-violating decays of smuon and scharm

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In the bulk matter Randall-Sundrum (RS) model, matter fields reside in the bulk of 5D warped spacetime and the Higgs field on the IR brane. Fields of 1st and 2nd generation matter particles are localized towards the UV brane while those of 3rd generation towards the IR brane, so that the hierarchical structure of Yukawa couplings arises geometrically, without hierarchy in fundamental parameters.

This paper discusses an experimental test of this model in cases where the Kaluza-Klein scale is far above the collider scale, but the model is combined with 5D Minimal SUSY Standard Model (MSSM) and SUSY particles are in the reach of collider experiments.

A general SUSY breaking mass spectrum consistent with this framework is considered; SUSY breaking sector locates on the IR brane and its effects are mediated to 5D MSSM through a hybrid of gravity mediation, gaugino mediation and gauge mediation.

This paper argues that, at future lepton colliders, one can observe the signals of the bulk matter RS model through rare decays of almost SU(2) singlet smuon mass eigenstate" and almost SU(2) singlet scharm mass eigenstate" that are induced by gravity mediation contributions to matter soft SUSY breaking terms.

Presenter: Mr YAMADA, Toshifumi (Sokendai, KEK)

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