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Warped Radion Dark Matter

Sunday, August 28, 2011 11:15 AM (20 minutes)

I will discuss the viability of the KK-radion in Warped Universal Extra Dimensional models as a DM candidate in the context of thermal and non-thermal production in the early universe. In the thermal case, the KK-radion can account for the observed DM density when the radion decay constant is in the natural multi-TeV range. The effects of coannihilation with the first KK excitation of the RH top, as well as the effects of radion-Higgs mixing, which imply mixing between the KK-radion and a KK-Higgs (both being KK-parity odd) become important for slightly larger values of the radion decay constant. The non-thermal scenario, with a high radion decay constant, can also lead to a viable scenario provided the reheat temperature and the radion decay constant take appropriate values, although the reheat temperature should not be much higher than the TeV scale.

Direct detection is found to be feasible if the DM has a small (KK-parity odd) Higgs admixture. Indirect detection via a photon signal from the galactic center is an interesting possibility. Colliders can probe characteristic aspects of the DM sector of warped scenarios with KK-parity, such as the degeneracy between the radion and the KK-radion (DM) modes.

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