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On the implementation of the UED model in Pythia, CalcHEP and MadGraph

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We study analytically and numerically the production cross-sections in the UED model where all SM model fields propagate in one extra compact dimension. We derive analytical formulas for the parton-level cross-sections in the general case of non-degenerate KK masses. We compare numerically three existing mUED implementations: PYTHIA, CalcHEP and MadGraph. We identify and remove some inconsistencies in the mUED implementation in Pythia. We also estimate the size of previously neglected diagrams with level 2 KK partners, as well as diagrams mediated by electroweak KK partners.

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