

Massive Gravity on a Brane

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dRGT theory is the unique ghost-free theory of massive gravity and it realizes a full nonlinear completion of the linear Fierz-Pauli theory for a massive spin-2 field. In addition to being an interesting field theoretic modification of General Relativity, it could potentially explain the late-time cosmic acceleration of our universe as an alternative to a small cosmological constant. However, dRGT is an effective field theory with a very low strong coupling scale $\Lambda_3 \sim (1000km)^{-1}$ and in order to have a consistent modification of gravity that is compatible with short distance tests of GR, the theory must be UV completed in some way. It seems that a UV completion analogous to the Higgs mechanism for massive non-Abelian gauge theory will not work in flat space but there does exist a known mechanism for dynamically generating mass for the graviton in AdS space. We utilize this mechanism in a Randall-Sundrum-like scenario where our world is a flat boundary of a cutoff AdS space. The dRGT action is on the boundary and the bulk has gravity coupled to scalar fields that dynamically gains a mass. This massive graviton then has a 'zero-mode' which plays the role of the graviton on the brane and it's effective 4d dynamics are such that they raise the cut-off of massive gravity from $(1000km)^{-1} \sim 10^{-19} MeV$ to as high as $10^{19} MeV$.

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