

Dynamical String Tension Theories: New possibilities for Gravity, Cosmology, Thermodynamics and Brane world Scenarios

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Abstract

If we are so eager to modify gravity, why can't we modify string theory?, which in turn can give us even more modified gravity theories. For example the string tension does not have to be put in by hand, it can be dynamically generated, as in the case when we formulate string theory in the modified measure formalism. For gravity theories, the modified measure formalism gives a dynamical cosmological constant. Then string tension appears, but as an additional dynamical degree of freedom. It can be seen however that this string tension is not universal, but rather each string generates its own string tension, which can have a different value for each string. We also define a new Tension scalar background field which change locally the value of the string tension along the world sheets of the strings. When there are many strings with different string tensions this Tension field can be determined from the requirement of world sheet conformal invariance and for two types of string tensions depending on the relative sign of the tensions we obtain non singular cosmologies and warp space scenarios and when the two string tensions are positive, we obtain scenarios where the Hagedorn temperature is avoided in the early universe or in regions of warped space time where the string tensions become very big. Bubbles and Braneworld scenarios where strings are constrained to be between two surfaces where the string tension grows to infinity also appear naturally in this approach.