

UM Physics Department

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Title: Is the Cosmological Constant Problem Properly Posed?

Abstract:

In applications of Einstein gravity, one replaces the quantum-mechanical energy– momentum tensor of sources such as the degenerate electrons in a white dwarf or the black-body photons in the microwave background by c-number matrix elements. And not only that, one ignores the zero-point fluctuations in these sources by only retaining the normal-ordered parts of those matrix elements. There is no apparent justification for this procedure, and we show that it is precisely this procedure that leads to the cosmological constant problem. We suggest that solving the problem requires that gravity be treated just as quantum-mechanically as the sources to which it couples, and show that one can then solve the cosmological constant problem if one replaces Einstein gravity by the fully quantum-mechanically consistent conformal gravity theory.