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Protected operators in de Sitter quantum gravity and dS/CFT
IAN MORRISON, The University of California at Santa Barbara — We investigate the infrared behavior of graviton and stress-energy tensor correlation functions in a de Sitter background. In particular, we examine the two- and three-point functions of these fields with respect to the de Sitter-invariant vacuum state of the interacting theory. We show that the Ward identities associated to stress-energy conservation, along with the de Sitter invariance of the vacuum, greatly constrain the infrared behavior of these correlation functions. We find that, in an appropriate gauge, the leading infrared behavior of the correlation functions is given by the Born approximation; that is, loop corrections do not effect the leading infrared behavior. We verify this statement in a number of examples. Our results indicate that de Sitter space is stable with respect to quantum gravitational perturbations. Our results also support the general notion of a dS/CFT correspondence: the bulk graviton is a protected operator whose asymptotic behavior near the conformal boundaries is not significantly altered by perturbative interactions in the bulk.

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