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Local graviton two-point function in a dressed background JORDAN MOXON, EANNA FLANAGAN, Cornell University — In quantum field theories, one can construct states, such as squeezed states, that source local negative expectation values of the energy density. This local violation of classical energy conditions is of interest for gravitational theories, in which negative energy densities may produce distinctive signatures in nearby metric perturbations. Semiclassical gravity is invalid for such states, due to their high variance, so we evaluate gravitational effects using an effective field theory obtained from the Einstein action coupled to a scalar. We present a detailed computation of the local two-point function of the metric perturbation sourced by a squeezed state to tree level. We canonically quantize the metric perturbation using Dirac quantization techniques, and compute the dressed state via the resulting first-class constraints. The calculation method is motivated by prior work by Donoghue and by Ford, who have explored other observables in similar theories.

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