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Effects of Conformally Invariant Quantum Fields on Future Singularities - Part I[1] ERIC D. CARLSON, ANDREW J. LUNDEEN, JOHN R. EINHORN, PAUL R. ANDERSON, Wake Forest University — The effects of conformally invariant quantum fields on universes with future singularities are investigated. It is assumed that these singularities are caused by dark energy in the form of a perfect fluid with a known equation of state. The sign of the coefficient of the $\Box R$ term in the trace of the semi-classical backreaction equations determines the behavior of the universe. For one sign, the universe must expand forever, driving it inevitably to the singularity in all cases. For the other sign, the universe will inevitably reach a maximum size, avoiding a future singularity, for big rip (type I) and little rip cosmologies, while it may or may not reach a maximum size before encountering the singularity for type III, II, or IV singularities depending on initial conditions. Though the approach or avoidance of said singularities may occur on the Planck scale, this can be avoided if the coefficient of $\Box R$ is sufficiently large, possibly due the presence of large numbers of quantum fields.

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