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Quantum mechanical healing of classical singularities DEBORAH A. KONKOWSKI, U.S. Naval Academy, THOMAS M. HELLIWELL, Harvey Mudd College — How effective is quantum mechanics at healing classical spacetime singularities? A maximal spacetime has a classical singularity if it contains incomplete geodesics, while it has a quantum singularity if the propagation of a quantum wave packet is ill posed (in particular, if the Klein-Gordon wave operator is not essentially self-adjoint). We consider a wide class of classically singular spacetimes whose metric coefficients, as the singularity is approached, become power laws in one of the spatial coordinates. We then determine the range of exponents for which quantum-mechanical particles are unable to detect the classical singularity so that the corresponding spacetimes are quantum-mechanically nonsingular.

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