1145-83-2672 **Deborah A Konkowski*** (dak@usna.edu), Department of Mathematics, 572C Holloway Road, U.S. Naval Academy, Annapolis, MD 21012, and **Thomas M Helliwell** and **J Williams**.
Classical and quantum singularities in self-similar solutions of Einstein's equations.

In classical general relativity incomplete causal geodesic paths in maximal spacetimes indicate classical singularities. Such singularities are ubiquitous in relativistic spacetimes as Hawking and Penrose showed in their famous singularity theorems of the mid-twentieth century. A major question of this century is whether classical singularities will be erased in a full quantum version of general relativity. No single quantum gravity theory has primacy, however; versions of loop quantum gravity and string theory are in the forefront at this time. A more modest approach is to replace classical geodesic paths with quantum wave packets and look to see if there is a unique, well-defined quantum evolution. That is our method, one based on a paper by Horowitz and Marolf, following earlier work by Wald. One examines a quantum wave operator, in this case the relativistic Klein-Gordon operator, and sees if it is essentially self-adjoint. Here a particularly interesting family of self-similar spacetimes with timelike curvature singularities is investigated. We find, using Weyl's limit point-limit circle criterion, that for asymptotically power-law metrics the wave operator is not essentially self-adjoint. They are quantum mechanically singular. (Received September 25, 2018)