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Stable Big Bang formation

In this talk we will investigate the past dynamics of cosmological solutions to Einstein's equations, containing a Big Bang singularity. More precisely, we will focus on the classical generalised Kasner examples. The celebrated ``singularity'' theorem of Hawking tells us that the past of sufficiently small perturbations of such solutions are causally geodesically incomplete. However, it is not in general known whether such a degeneracy is related to the formation of a curvature singularity. In many cases, unstable dynamics are predicted, which add to the difficulty of the problem. We will discuss joint work with I. Rodnianski and J. Speck that classifies the behavior of perturbed solutions in the so-called subcritical regime.