

Cosmic Censorship and the Fate of Spheroidal Collapse

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I will discuss a study of the collapse of spheroidal configurations of collisionless particles in full general relativity. This setup was originally considered by Shapiro and Teukolsky (1991), where it was found that prolate configurations with sufficiently large semi-major axis gave rise to diverging curvature, but no apparent horizon. This was taken as evidence for the formation of a naked singularity, in violation of Cosmic Censorship. I will present results revisiting such configurations using different coordinates/slicing, and considering a range of values for the semi-major axis and eccentricity of the initial matter distribution. The main result is that all cases studied are found to evolve towards a final state consisting of a black hole plus gravitational radiation. Though initially distorted, the proper circumferences of the apparent horizons that are found do not significantly exceed the hoop conjecture bound. Configurations with larger semi-major axis can produce strong gravitational radiation, with luminosities up to $P_{\text{GW}} \sim 2 \times 10^{-3} c^5/G$.