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The Rotating Black Hole Interior: Insights from Gravitational Collapse in (2+1)D[1] ALEX PANDYA, FRANS PRETORIUS, Princeton University — We address a hole in the space of existing toy models for the astrophysical black hole (BH) interior by simulating the gravitational collapse of *rotating* matter in (2+1)D classical general relativity. We compare and contrast our time-dependent numerical solution to the stationary analytic solution due to Bañados, Teitelboim, and Zanelli (BTZ), as well as to the celebrated Kerr solution. We focus on three features in the dynamical case: the singularity structure, the regularity of the Cauchy horizon, and the geodesic-focusing effect first described by Marolf & Ori. We observe the latter effect for the first time in a BH formed from gravitational collapse. We also find that curvature singularities form at the origin and Cauchy horizon for low spin, but disappear entirely for sufficiently high spins, signaling a violation of the C^0 and C^2 formulations of the strong cosmic censorship conjecture.

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Alex Pandya
Princeton University

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