

Abstract Submitted  
for the APR15 Meeting of  
The American Physical Society

**Numerical Tests of the Cosmic Censorship Conjecture via Event-Horizon Finding**<sup>1</sup> MARIA OKOUNKOVA, CHRISTIAN OTT, MARK SCHEEL, BELA SZILAGYI, Caltech — We present the current state of our research on the possibility of naked singularity formation in gravitational collapse, numerically testing both the cosmic censorship conjecture and the hoop conjecture. The former of these posits that all singularities lie behind an event horizon, while the latter conjectures that this is true if collapse occurs from an initial configuration with all circumferences  $C \leq 4\pi M$ . We reconsider the classical Shapiro & Teukolsky (1991) prolate spheroid naked singularity scenario. Using the exponentially error-convergent Spectral Einstein Code (SpEC) we simulate the collapse of collisionless matter and probe for apparent horizons. We propose a new method to probe for the existence of an event horizon by following characteristic from regions near the singularity, using methods commonly employed in Cauchy characteristic extraction.

<sup>1</sup>This research was partially supported by NSF under award no. PHY-1404569.

Maria Okounkova  
Caltech

Date submitted: 07 Jan 2015

Electronic form version 1.4