

Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Evaluating event horizon finding techniques MICHAEL COHEN, HARALD PFEIFFER, MARK SCHEEL, Caltech — Event horizons are the defining physical features of black hole spacetimes, and are of considerable interest in studying black hole dynamics. Because of their global nature, event horizons can only be determined after the end of a numerical simulation. Methods of finding event horizons in numerically-generated spacetimes are based on the fact that outgoing null geodesics near an event horizon converge exponentially to the horizon when followed backwards in time. Two existing methods in the literature are discussed: an individual-geodesic method and a level-set method. A third and intermediate method, a surface-flow method, is presented here and implemented numerically alongside the geodesic method. Both single black holes and head-on black hole mergers are explored as test cases. The most robust method for black hole mergers is found to be the individual-geodesic method. The presented techniques are remarkably accurate and allow to track the event-horizon through several quasi-normal oscillations during ringdown of the binary merger.

Michael Cohen
Caltech

Date submitted: 11 Jan 2008

Electronic form version 1.4