

Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Close encounters of three black holes¹ MANUELA CAMPANELLI, CARLOS LOUSTO, YOSEF ZLOCHOWER, Rochester Institute of Technology — We present the first fully relativistic longterm numerical evolutions of three equal-mass black holes in a hierarchical system consisting of a third black hole in orbit about a black-hole binary at twice the binaries separation. We find that these close-three- black-hole systems can have very different merger dynamics than black-hole binaries. In particular, we see distinctive waveforms, a suppression of the emitted gravitational radiation, and a redistribution of the energy of the system that can impart substantial kicks to one of the members of the binary. We evolve two such configurations and find very different behaviors. In one configuration the binary is quickly disrupted and the individual holes follow complicated trajectories and merge with the third hole in rapid succession, while in the other, the binary completes a half-orbit before the initial merger of one of the members with the third black hole, and the resulting two-black- hole system forms a highly elliptical, well separated binary that shows no significant inspiral for (at least) the first $t = 1000M$ of evolution.

¹We acknowledge NSF support from grants PHY-0722315, PHY-0722703, PHY-0714388,PHY-653303.

Manuela Campanelli
Rochester Institute of Technology

Date submitted: 08 Jan 2008

Electronic form version 1.4