Adventures in Theory

A Lecture Series in Theoretical and Mathematical Science

Manuela Campanelli

Rochester Institute of Technology

School of Mathematical Sciences and the Director of the Center for Computational Relativity and Gravitation

Merging Black-Holes in General Relativity

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2:00pm

2237 French Family Science Building

Duke University

CTMS

The field of numerical relativity experienced a phenomenal growth spurt during the past six years. The field transformed from one in which the two-body problem that is the merger of black-hole binaries, was impossible to solve to one where simulations of merging black-holes are now routine. Among the most remarkable discoveries is the one that merging pair of spinning black holes can recoil thousands of km/s, generating very strong emission of gravitational waves in the last few orbits of the collision. The detection these gravitational waves will constitute a major breakthrough in fundamental physics, opening a new window on the universe. For supermassive black-holes in active galaxies, these merger events are also expected to be accompanied by observable electromagnetic signals. In this talk I will review the latest achievements and highlight the field's next challenges with emphasis on applications to both gravitational wave and electromagnetic astronomy and astrophysics. I will also present the first magneto hydrodynamics (MHD) calculation of a circumbinary accretion disk around supermassive black-holes.