1052-83-291   **Manuel Tiglio*** (`tiglio@umd.edu`), CSCAMM, 4129 CSIC Bldg #406, Paint Branch Drive, University of Maryland, College Park, MD 20742-2389. *Binary black hole collisions: techniques, status and prospects.*

The two body problem in General Relativity corresponds to the description of the collision of two black holes. The problem, consisting on a rather large set of elliptic and hyperbolic quasi-linear partial differential equations on non-trivial geometries, is challenging from a mathematical, numerical and scientific computing perspective. At the same time it is a problem of great physical interest since it is expected to be one of the main sources of gravitational waves to be measured by a network of earth-based interferometer detectors already collecting data. These detectors aim at verifying Einstein's theory in the strong field regime for the very first time, and open a new window to the universe. Advanced techniques in all these fronts had to been used/developed to be able to tackle the problem. I will give a summary of these challenges, as well as some of the techniques being used to produce high accuracy simulations of binary black holes problem through massively parallel supercomputers, and the remaining challenges. (Received August 31, 2009)