

BIERI Lydia

The Einstein Equations and Gravitational Radiation

In Mathematical General Relativity (GR) the Einstein equations describe the laws of the universe. This system of hyperbolic nonlinear pde has served as a playground for all kinds of new problems and methods in pde analysis and geometry. A major goal in the study of these equations is to investigate the analytic properties and geometries of the solution spacetimes. In particular, fluctuations of the curvature of the spacetime, known as gravitational waves, have been a highly active research topic. A few weeks ago, it was confirmed that advanced LIGO detected gravitational waves. Understanding gravitational radiation is tightly interwoven with the study of the Cauchy problem in GR. I will talk about geometric-analytic results on gravitational radiation and the memory effect of gravitational waves. We will connect the mathematical findings to experiments. I will also address recent work with David Garfinkle on gravitational radiation in asymptotically flat as well as cosmological spacetimes.