LECTURE

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Geometry and analysis in black hole spacetimes

4 lessons of one hour each

Black holes play a central role in general relativity and astrophysics. The problem of proving the dynamical stability of the Kerr black hole spacetime, which is describes a rotating black hole in vacuum, is one of the most important open problems in general relativity. Following a brief introduction to the evolution problem for the Einstein equations, I will discuss the main features of the geometry of the Kerr spacetime, including its algebraically special nature and consequences thereof. I will then present some aspects of the black hole stability problem, and present the main steps in the recent proof of linearized stability of the Kerr black hole spacetime, see arXiv:1903.03859.