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General initial data for simulations of compact binary systems[1]
FRANK LÖFFLER, Louisiana State University, ROLAND HAAS, TANJA BODE, Georgia Institute of Technology, BRUNO MUNDIM, Rochester Institute of Technology — Some of the most energetic events in astrophysics are believed to be connected to the interaction and merger of compact binaries, consisting of neutron stars and/or black holes. Yet, there are still a lot of uncertainties, especially on binaries involving at least one neutron star. General relativistic effects have to be taken into account when studying these compact objects, which make analytic studies very hard. Computer simulations of binaries of neutron stars and/or black holes typically solve Einstein's equations of General Relativity and a system of hydrodynamics equations in order to obtain a time sequence. However, the initial data needed to start this sequence also has to satisfy a set of elliptic constraint equations. Solving these equations is difficult for general initial configurations, which is why most solvers are restricted to a very narrow set of parameters. In this talk, we describe one method of generating intial data for compact binary systems, leaving most of the parameters, such as momenta and spins, free to choose.

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