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Null Asymptotics of Solutions of the Einstein-Maxwell Equations in General Relativity and Gravitational Radiation

A major goal of mathematical General Relativity (GR) and astrophysics is to precisely describe and finally observe gravitational radiation, one of the predictions of GR. In order to do so, one has to study the null asymptotical limits of the spacetimes for typical sources. Among the latter we find binary neutron stars and binary black hole mergers. In these processes typically mass and momenta are radiated away in form of gravitational waves. D. Christodoulou showed that every gravitational-wave burst has a nonlinear memory. In this talk, we discuss the null asymptotics for spacetimes solving the Einstein-Maxwell (EM) equations, compute the radiated energy and derive limits at null infinity and compare them with the Einstein vacuum (EV) case. Here, we rely on the methods introduced in the works of Christodoulou, Klainerman, Bieri and Zipser.