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Gravitational and electromagnetic signatures of accretion into a black hole

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We present the derivation and the solutions to the coupled electromagnetic and gravitational perturbations with sources in a charged black hole background. We consider as source of the perturbations the infall of radial currents. In this way, we study a system in which it is provoked a response involving both, gravitational and electromagnetic waves, which allows us to analyze the dependence between them. We solve numerically the wave equations that describe both signals, characterize the waveforms and study the relation between the input parameters of the infalling matter with those of the gravitational and electromagnetic responses.

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