

Magnetospheres, jets and pulsed emission from compact objects

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The time-variable (in particular pulsed-) emission from black holes and neutron stars holds key information on the nature of curved spacetime and ultra dense nuclear matter. However, due to the complex plasma dynamics at play, the interpretation of the observed signals is difficult. I will present some recent work on modeling general relativistic magnetohydrodynamic processes around black holes. I will first discuss the dynamics of strongly perturbed black hole magnetospheres as they can occur for example during binary neutron star merger events. The simulations have revealed a brief ‘black-hole pulsar’ phase, followed by an intriguing alignment of the magnetic moment and black hole spin which can uniquely imprint the high energy emission of the current sheet. I will further discuss the transient dynamics of multipolar black hole magnetospheres which rapidly transition to a universal split-monopolar configuration.

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