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New understandings of black hole mergers

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Historically, studies of the merger stage of a black hole binary have centred on fully nonlinear numerical relativity simulations. However, nonlinear black hole perturbation theory provides powerful insights into the ringdown regime immediately following merger, and perturbative self-force theory has proved highly accurate in describing asymmetric binary inspirals even for mass ratios not too far from 1. Here I present a self-force framework for perturbatively modelling the full binary evolution through merger and ringdown, highlighting the synergies with ringdown calculations.

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