Abstract Submitted
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Momentum flow in numerical simulations of binary black hole mergers[1] GEOFFREY LOVELACE, Cornell University, MARK SCHEEL, ULRICH SPERHAKE, YANBEI CHEN, DREW KEPPEL, DAVID NICHOLS, California Institute of Technology — Most research on extracting science from binary-black-hole simulations has adopted a "scattering matrix" perspective: given the binary's initial parameters, what are the final hole's parameters and the emitted gravitational waveform? In contrast, we are using binary-black-hole simulations to explore the nonlinear dynamics of curved spacetime. We use the Landau-Lifshitz pseudotensor to describe the density and flux of a binary's linear momentum. Focusing on the head-on plunge, merger, and ringdown of a binary black hole with antiparallel spins, we explore numerically the momentum flow between the holes and the surrounding spacetime. To investigate the gauge dependence of our results, we compare simulations in several different gauges, and we also compare our simulations with the Maxwell-like post-Newtonian approximation.

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Geoffrey Lovelace
Cornell University

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