

Abstract Submitted  
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**Post-Newtonian Approximation in a Maxwell-Like Form for Use in Interpreting Binary-Black-Hole Simulations**<sup>1</sup> JEFF KAPLAN, DAVID NICHOLS, KIP THORNE, California Institute of Technology — Recent numerical-relativity simulations of binary-black-hole mergers have revealed large gravitational recoils. These results motivate us to explore the distribution and flow of linear momentum inside compact binaries. A powerful tool in our explorations is a formulation of the first post-Newtonian approximation to general relativity in a “gravitoelectromagnetic” Maxwell-like form that facilitates physical intuition. Relying heavily on work of Damour, Soffel and Xu, we have fleshed out this formulation, including all nonlinearities. We focus especially on density and flux of gravitational momentum, as expressed in terms of the Landau-Lifshitz pseudotensor, which we bring into forms that are almost identical to those for the electromagnetic field.

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