Abstract Submitted
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Global Aspects of Radiation Memory[1] JEFFREY WINICOUR, University of Pittsburgh — The gravitational radiation memory effect produces a net displacement of test particles. The proposed sources lead to E mode memory, as characterized by an even parity polarization pattern. Although odd parity, or B mode, radiation memory is mathematically possible, no physically realistic source has been identified. There is an electromagnetic counterpart to radiation memory which produces a net momentum "kick" of charged test particles. A global null cone treatment shows that electromagnetic E mode memory requires unbounded charges and no physically realistic source produces B mode memory. A compelling theoretical aspect of E mode gravitational radiation memory is related to the supertranslations in the Bondi-Metzner-Sachs (BMS) asymptotic symmetry group. For a stationary system, supertranslations can be eliminated and the BMS group reduced to the Poincare group, for which angular momentum is well-defined. However, for a stationary to stationary transition, the two Poincare groups obtained at early and late times differ by a supertranslation if the gravitational radiation has nonzero E mode memory. This suggests a distinctly general relativistic mechanism for angular momentum loss and presents a ripe problem for the numerical simulation of high spin black hole binaries.

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