Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Towards a perturbative treatment of gravitational wave memory
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— Despite the weakness of gravitational radiation, the analysis of gravitational wave memory is usually taken to require the full nonlinear apparatus of general relativity. However, one form of gravitational wave memory has to do with fields such as the electromagnetic field and neutrinos which can get to null infinity. We show how to derive the memory effects of these fields using only first order perturbation theory. We expect that this method, when extended to second order perturbation theory, can also be used to account for the memory effect due to the loss in energy by gravitational radiation.

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Date submitted: 11 Jan 2013 Electronic form version 1.4