A gravitational memory effect in “boosted” black hole perturbation theory. Reinaldo J. Gleiser and Alfredo E. Domínguez  Facultad de Matemática, Astronomía y Física, Universidad Nacional de Córdoba, gleiser@fis.uncor.edu

abstract Black hole perturbation theory, or more generally, perturbation theory on a Schwarzschild background, has been applied in several contexts, but usually under the simplifying assumption that the ADM momentum vanishes, namely, that the evolution is carried out and observed in the “center of momentum frame”. In this paper we consider some consequences of the inclusion of a non vanishing ADM momentum in the initial data. We first provide a justification for the validity of the transformation of the initial data to the “center of momentum frame”, and then analyze the effect of this transformation on the gravitational wave amplitude. The most significant result is the possibility of a type of gravitational memory effect that appears to have no simple relation with the well known Christodoulou effect.