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Displacement memory for flyby

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Zel'dovich and Polnarev, in their seminal paper on the displacement memory effect [1], suggested that particles hit by a burst of gravitational waves generated by flyby would be merely displaced. Their prediction is confirmed by fine-tuning the wave profile, which is the derivative of a Gaussian proposed by Gibbons and Hawking [2], or of its approximation by a P\"oschl-Teller potential. The latter admits that analytic solutions are consistent with numerical investigations. The study is extended to higher-order derivative profiles as proposed, e.g., for gravitational collapse, etc.
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