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Gravitational Bremsstrahlung in the Post-Minkowskian Effective Field Theory

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We study the gravitational radiation emitted during the scattering of two spinless bodies in the post-Minkowskian Effective Field Theory approach. We derive the conserved stress-energy tensor linearly coupled to gravity and the classical probability amplitude of graviton emission at leading and next-to-leading order in the Newton's constant G. The amplitude can be expressed in compact
form as one-dimensional integrals over a Feynman parameter involving Bessel functions. We use it to recover the leading-order radiated angular momentum. Upon expanding it in the relative velocity between the two bodies v, we compute the total four-momentum radiated into gravitational waves at leading-order in G and up to order v^8, finding agreement with what recently computed using scattering amplitude methods. Our results also allow to investigate the zero frequency limit of the emitted energy spectrum.

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