

Absorptive Effects and Classical Black Hole Scattering

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I will describe an approach to incorporating absorption effects into the post-Minkowskian effective description of two-body classical gravitational scattering. By coupling the usual point-particle effective description to an invisible sector of gapless internal degrees-of-freedom, the leading-order absorptive effects are encoded in the low-energy expansion of a spectral density function; for black holes this spectral function is obtained by matching an absorption cross-section calculated in black hole perturbation theory. This information is then recycled using the scattering amplitudes-based KMOC formalism to calculate the impulse on and change in rest mass of a Schwarzschild black hole scattering with a second compact body sourcing a massless scalar, electromagnetic or gravitational field. I will show that the results obtained are consistent with both worldline Schwinger-Keldysh calculations and numerical scalar self-force results.

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