

Moving black holes: energy extraction, absorption cross-section and the ring of fire

We consider the interaction between a plane wave and a (counter-moving) black hole. We show that energy is transferred from the black hole to the wave, giving rise to a *negative* absorption cross-section. Moving black holes absorb radiation *and* deposit energy in external radiation. Due to this effect, a black hole of mass M moving at relativistic speeds in a cold medium will appear to be surrounded by a bright “ring” of diameter $3\sqrt{3}GM/c^2$ and thickness $\sim GM/c^2$.

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