



ABSORPTION OF ELECTROMAGNETIC PLANE WAVES BY ROTATING BLACK HOLES

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We study the absorption of monochromatic electromagnetic plane waves impinging upon a Kerr black hole, in the general case that the direction of incidence is not aligned with the black hole spin axis. We present numerical results that are in accord with low- and high-frequency approximations. We find that circularly polarized waves are distinguished by the black hole spin, with counter-rotating polarizations being more absorbed than co-rotating polarizations. At low frequencies and moderate incidence angles, there exists a narrow parameter window in which superradiant emission in the dipole mode can exceed absorption in the non-superradiant modes, allowing a planar electromagnetic wave to stimulate net emission from a black hole.