

Motion of electron near black hole

We consider a black hole metric in which the spacetime outside the event horizon is rotating with a constant angular velocity. From this metric, we derive the equations of motion. We then calculate the radii of the light cylinders—two real solutions arising from a cubic equation (the third being complex and unphysical). We also identify the radii corresponding to steady (circular) orbits. Using this information, we assign a physical interpretation to each radius and describe the nature of the associated orbits. Finally, we calculate the maximum energies that an electron can attain in this spacetime, taking into account relevant constraining factors and compare this results to maximum energies of electrons with Schwarzschild's metric.

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