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Near-horizon structure of escape zones of electrically charged particles around weakly magnetized rotating black hole: case of oblique magnetosphere

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We study the effects of large scale magnetic field on the dynamics of charged particles near a rotating black hole. We consider a scenario in which the initially neutral particles on geodesic orbits in the equatorial plane are destabilized by a charging process. Fraction of charged particles are then accelerated out of the equatorial plane and then follow jet-like trajectories with relativistic velocities. We explore non-axisymmetric systems in which the magnetic field is inclined with respect to the black hole spin. We study the system numerically in order to locate the zones of escaping trajectories and compute the terminal escape velocity. By breaking the axial symmetry we notice increasing fraction of unbound orbits which allow for acceleration to ultrarelativistic velocities.

Author: KARAS, Vladimir (Astronomical Institute, Czech Academy of Sciences)

Co-author: Dr KOPACEK, Ondrej (Astronomical Institute)

Presenter: KARAS, Vladimir (Astronomical Institute, Czech Academy of Sciences)

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