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High-energy collision of particles in the magnetic field far from black holes

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Abstract

© 2014 World Scientific Publishing Company. We consider collision of two particles in the axially symmetric black hole metric in the magnetic field. If the value of the angular momentum |L| of one particles grows unbound (but its Killing energy remains fixed) one can achieve unbound energy in the center-of-mass frame Ec.m. In the absence of the magnetic field, collision of this kind is known to happen in the ergoregion. However, if the magnetic field strength B is also large, with the ratio |L|/B being finite, large Ec.m. can be achieved even far from a black hole, in the almost flat region. Such an effect also occurs in the metric of a rotating star.

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Keywords

Center-of-mass, Ergosphere, Magnetic field