

# On geodesics with negative energies in the ergoregions of dirty black holes

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## Abstract

© 2015 World Scientific Publishing Company. We consider behavior of equatorial geodesics with the negative energy in the ergoregion of a generic rotating "dirty" (surrounded by matter) black hole. It is shown that under very simple and generic conditions on the metric coefficients, there are no such circular orbits. This entails that such geodesic must originate and terminate under the event horizon. These results generalize the observation made for the Kerr metric in A. A. Grib, Yu. V. Pavlov and V. D. Vertogradov, *Mod. Phys. Lett.*29, 1450110 (2014), arXiv:1304.7360.

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## Keywords

Ergoregion, negative energy