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Geodesic chaos in perturbed black-hole fields

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Dynamics of time-like geodesics in the static and axially symmetric field of a black hole surrounded by a thin disc or ring is studied in several different ways: on Poincaré sections, on phase-variable behaviours and their power spectra, and by two recurrence methods. The geodesic motion turns chaotic if the disc/ring is sufficiently massive and/or if the particle has sufficiently large energy. The occurrence of chaos due to the presence of ambient matter may be important for the evolution and appearance of astrophysical black-hole systems.