



Contribution ID: 159

Type: **not specified**

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Tuesday 20 December 2022 17:15 (15 minutes)

Motivated by processes happening around accreting black holes, a series of papers entitled “Free motion around black holes with discs or rings: Between integrability and chaos” were published in order to classify and evaluate the chaotic behaviour that may occur in geodesic motion around static black holes if these are perturbed by gravity of some additional matter. However the static and axisymmetric spacetime superpositions, which, at least in the vicinity of sources, is likely not adequate since accreting compact objects are rather supposed to rotate rapidly. Actually, it is interesting to examine how the rotation-induced space-time dragging affects the geodesic dynamics. For this purpose, we use a recently derived metric (Čížek & Semerák 2017) describing a linear perturbation of a Schwarzschild black hole due to a rotating light finite thin disc. The work is still in progress, we will present some preliminary results.

Session Classification: Session 8 B