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Motion in perturbed Schwarzschild space-time

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We obtain relativistic Gaussian perturbation equations for osculating elements in Schwarzschild space-time background, for an arbitrary force not restricted to the equatorial plane. As an application, we solve the perturbation equations in linear approximation for force induced by the Kerr space-time as an expansion of the Schwarzschild space-time. For this case in post-Newtonian limit, we reproduce known Lense-Thirring original results. Also, we consider motion in the q-mertic space-time, which can be treated as the space-time of a BH with a quadrupole moment. For both space-times, we obtain relativistic observables.

Primary author: YANCHYSHEN, Oleksii (Bogolyubov Institute for Theoretical Physics)

Presenter: YANCHYSHEN, Oleksii (Bogolyubov Institute for Theoretical Physics)

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