

Non-geodesic corrections to mass-spin estimates for Galactic microquasars implied by QPO models

We study frequencies of axisymmetric and non-axisymmetric epicyclic modes of accretion disc oscillations and explore the influence of pressure forces present in the disc. We discuss the implications for estimations of black hole spin in the three Galactic microquasars, GRS 1915+105, GRO J1655-40, and XTE J1550-564, that have been carried out based on several models of 3:2 high-frequency quasi-periodic oscillations (QPOs). Our findings show that in the particular case of 3:2 epicyclic resonance model the presence of pressure forces affects the predicted QPO frequencies only slightly when $a < 0.9$. On the contrary, when $a > 0.9$, the influence of pressure forces is non-negligible. For several models this influence can be quite significant even for low values of spin. We furthermore discuss the differences between results obtained based on approximative analytic methods and those carried out using exact numerical methods.

Author: KOTRLOVA, Andrea (Silesian University in Opava, Research Centre for Computational Physics and Data Processing)

Co-authors: SRAMKOVA, Eva (Silesian University in Opava, Research Centre for Computational Physics and Data Processing); TOROK, Gabriel (Silesian University in Opava, Research Centre for Computational Physics and Data Processing); GOLUCHOVA, Katerina (Silesian University in Opava, Research Centre for Computational Physics and Data Processing); HORAK, Jiri (Astronomical Institute, Czech Academy of Sciences); STRAUB, Odele (Observatoire de Paris, CNRS)

Presenter: KOTRLOVA, Andrea (Silesian University in Opava, Research Centre for Computational Physics and Data Processing)