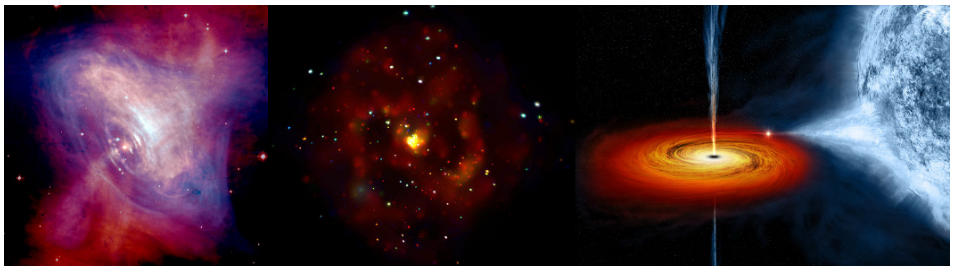

Contribution ID: **68** Type: **not specified**

# An accurate pseudo-Kerr formalism and its application to study transonic flows around black holes

*Tuesday, April 4, 2023 4:40 PM (10 minutes)*

Astrophysical black holes are remarkably simple objects, described completely by just two parameters –mass and spin. Although it is easy to determine the mass of a black hole from the far-field gravitational influence, the determination of spin is more subtle and it requires one to probe the strong gravity region close to the event horizon where the GR effects are prominent. However, to study all the physical processes in strong gravity limit using the exact Kerr metric is a formidable task, most certainly by theoretical means. There are numerical simulations which may have uncertain amount of dissipation in the numerical codes. For this reason we embarked on finding a very accurate pseudo-Kerr formalism which can be used in Newtonian equations and those not familiar with general relativity may also use it easily. We first apply this to study the transonic properties of accretion flows for all Kerr parameters and compare with exact solutions wherever available. We find the deviation from the exact results and found them to be negligible giving us confidence that numerical simulations with complete set of physical processes may be done using our formalism.

Reference: Bhattacharjee A., Chakrabarti S. K., Debnath D. 2022, RAA, 22, 035016

## Presentation Type

Oral

**Primary author:** Mr BHATTACHARJEE, Abhrajit (ICSP, Kolkata)

**Co-author:** Prof. CHAKRABARTI, Sandip (ICSP, Kolkata)

**Presenter:** Mr BHATTACHARJEE, Abhrajit (ICSP, Kolkata)

**Session Classification:** Short Talks

**Track Classification:** Short Talks