Physics of supermassive black holes and their star-forming environment

Czech-German Collaboration

26.11.2024 10:00, Location: ASU Praha-Spořilov

Two longer seminars will be followed by a series of short (~15 + 5 min) talks will be presented to start hands-on work and initiate further discussions related to the Czech-German Student Exchange (Prague-Cologne & Friends).

Program:

Vladimír Karas: Welcome, & Interacting accretion rings from tidally disrupted binaries • • Florian Peissker: Finding binaries in the S cluster: A 20-year journey • • Barbora Bezděková: Light trajectories near compact relativistic sources surrounded by media of dispersive and refractive properties • • Jan Palouš: Supernovae in the Galactic Center • • Emma Bordier: High-angular resolution insights into massive stars: revealing hidden companions and tracing back the formation history • • Maria Melamed: Galactic Center object G1 • • Chinmaya Nagar: Investigating stellar multiplicity in embedded young massive stellar clusters with NACO • • Myank Singhal: Evolution of stellar binaries in a disk • •

Zoom connection is available for remote participants

27.11.2024 10:10, Location: AU Praha-Troja

Ippocratis Saltas: Probing fundamental physics with stars

• • Joint walk in Prague downtown • •

Individual work and brainstorming discussion

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Notes on the general relativistic viscous ringed disc evolution

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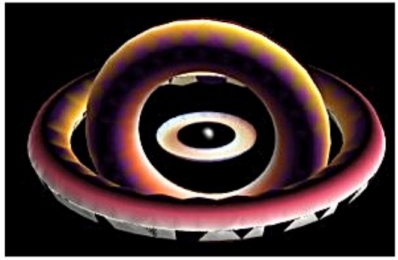
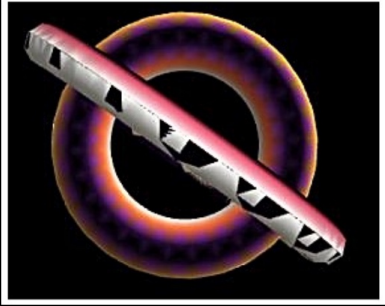
ABSTRACT

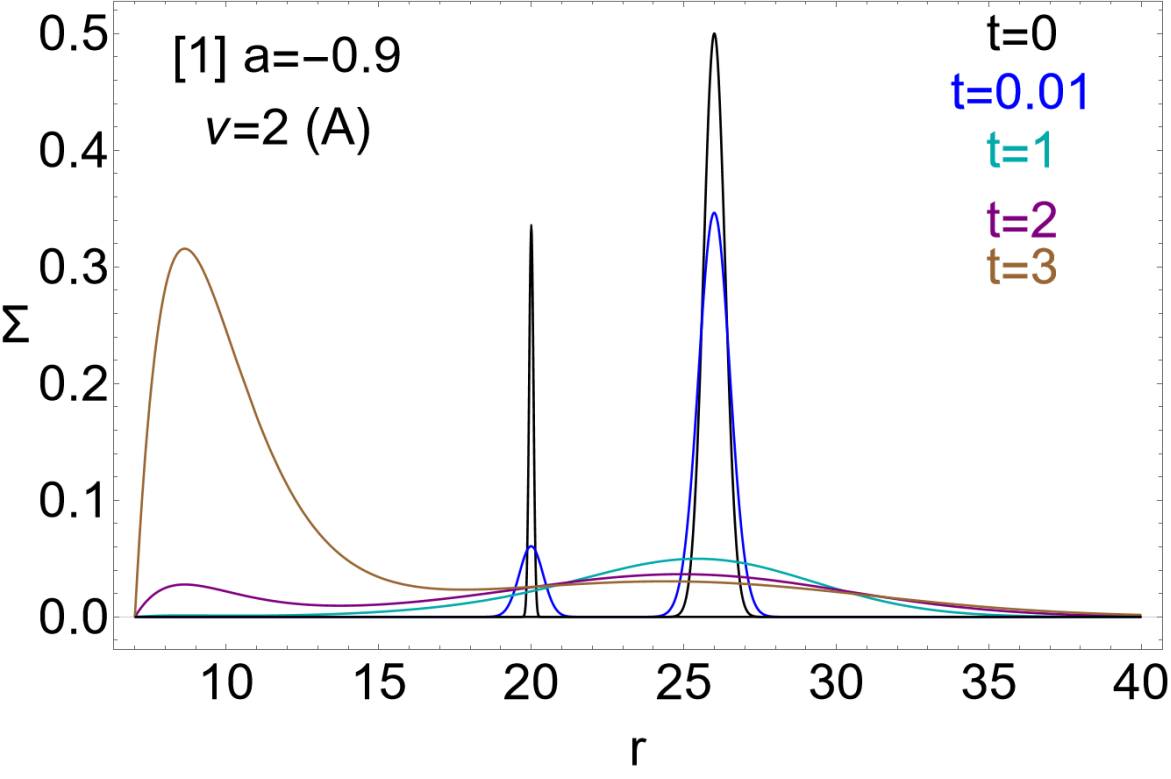
A ringed accretion disc (**RAD**) models a cluster of axis-symmetric co-rotating and/or counter-rotating tori orbiting in the equatorial plane of a central Kerr supermassive black hole. We discuss the time evolution of such a ringed disc within the general relativity framework. Our analysis presents a study of the evolving **RAD** properties using a thin-disc scheme and solving a diffusion-like evolution equation for a **RAD** in the Kerr space–time. In the first stage of evolution, there is the inter–disc interaction where the individual rings spread inwardly and outwardly, levelling the structure and forming a single distribution with maximum density determined by the initial spread of the component rings. Time-scales are dependent on viscosity prescriptions. The early time luminosity, dominated by the dynamics of the inner ringed structure, shows a clear mark of the inner ringed structure. The **RAD** eventually reaches a single disc phase, building accretion to the inner edge regulated by the inner edge boundary conditions. The late-time luminosity associated with the ringed disc follows a power law decline for the final single disc. In the sideline of this analysis, we also considered a modified prescription mimicking an effective turbulent viscosity in the early phases of the rings evolutions.

Key words: accretion, accretion discs – black hole physics – hydrodynamics – galaxies: active.





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Σ
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0.3
0.2
0.1
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