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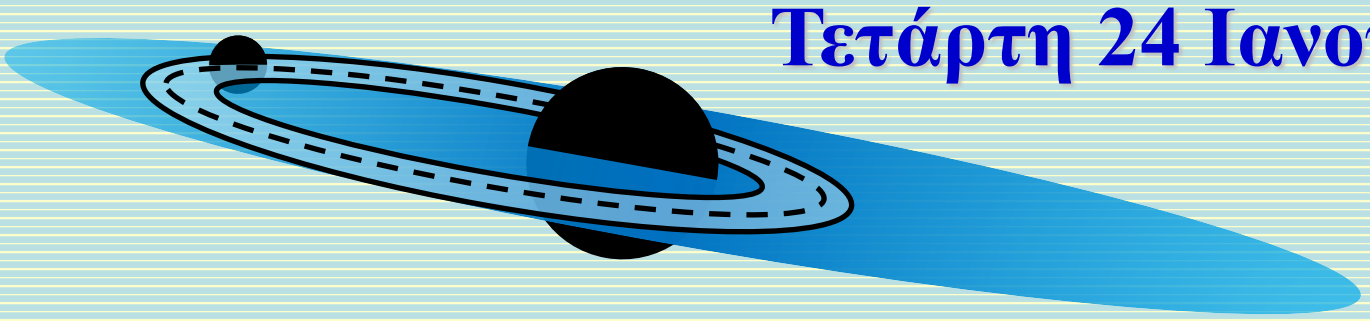
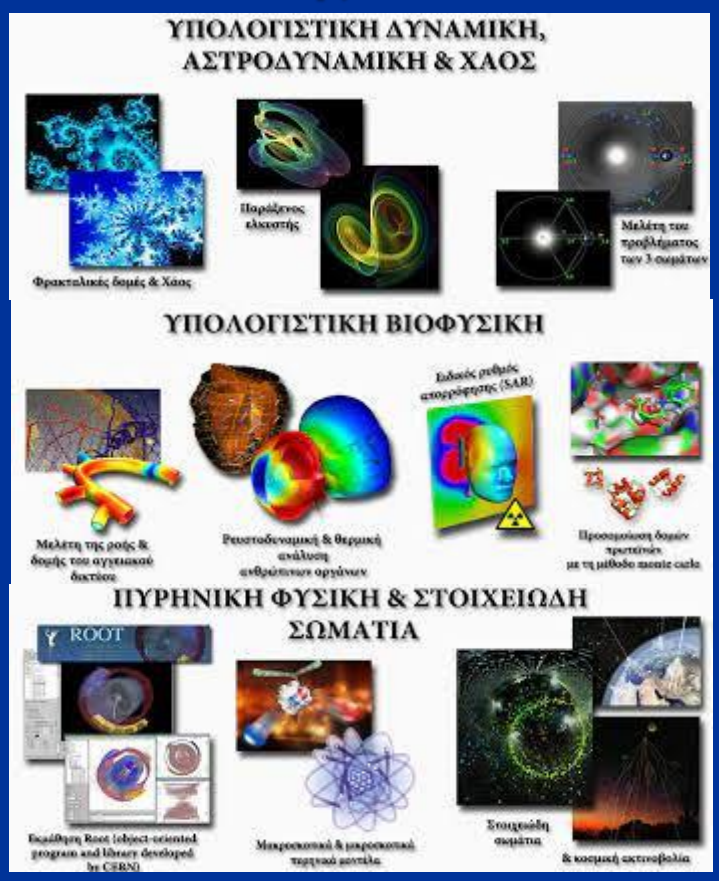


Τετάρτη 24 Ιανουαρίου 2024

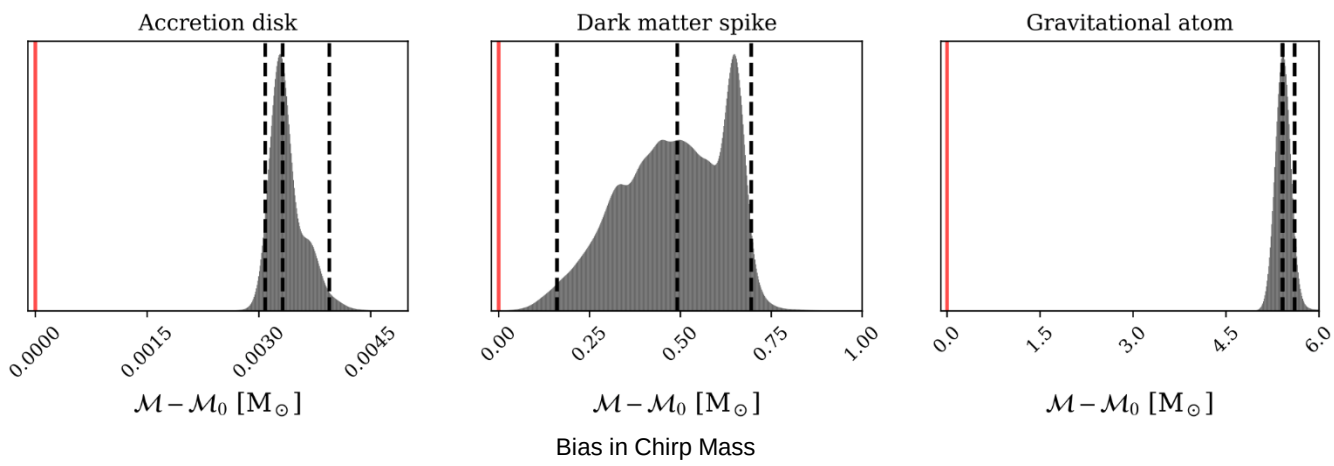
ώρα 11:00

Zoom link: https://authgr.zoom.us/j/93408351002

Σεμινάρια ΠΜΣ Υπολογιστικής Φυσικής 2023-2024



Disks, spikes and clouds: Distinguishing environmental effects on binary black hole gravitational waves



Bias in Chirp Mass

Theophanes Karydas
GRAPPA, University of Amsterdam

In the next decade, space-based gravitational wave detectors such as LISA or Taiji will enable the observation of an entire new frequency range. Upcoming discoveries such as intermediate and extreme mass ratio binary black hole inspirals open exciting new avenues for probing fundamental physics and physics beyond the standard model. Due to their nature, these binaries will remain in band for weeks, months or even years and as they inspiral they will slowly map the space-time around them. Environments around the black holes, can thus have a large effect on their motion and encode their properties on the emitted gravitational waveforms. In this talk, I will show that we can measure parameters with nested sampling not only for baryonic environments, such as accretion disks, but also exotic scenarios as the dark matter spike or clouds of scalar field (gravitational atoms). Furthermore, I will demonstrate the importance of surrogate modeling via machine learning in the hunt for these signals.

Το προφίλ του ομιλητή

Theophanes Karydas is an early career researcher who got his Bachelor's at the Aristotle University of Thessaloniki and his MSc degree in Gravitational and Astroparticle physics at the University of Amsterdam. During this time, he met Prof. Gianfranco Bertone with whom he has worked on the theoretical and numerical modeling of black hole inspirals embedded in dark matter overdensities, as well as developing machine learning "surrogate models" for fast waveform predictions.