



University of Crete
Department of Physics



FORTH
INSTITUTE OF ASTROPHYSICS



2023 Nick Kylafis Lecture Joint Physics & IA/FORTH Colloquium

Thursday, 19 October 2023 | 14:00 – 16:00, Amphitheater “G. Lianis” & Online

Understanding black holes from stars destroyed by tidal forces

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ABSTRACT

Tidal forces from a massive black hole can completely tear a passing star apart. This process was already recognised half a century ago, but it has only been studied in detail comparatively recently and exploited. In this talk, I will describe this process and discuss how astronomers are making use of these events to reveal the presence of a population of black holes that would otherwise be unobservable. These so-called tidal disruption events (TDEs) are enormously bright, and can be observed across the Universe in different regions of the spectrum. Six to twelve months after the initial event, the remains of the disrupted star have settled into the form of a disc, orbiting around the central black hole, which evolves slowly with time. From analysis of the spectra of these relativistic discs, we may obtain important information about the central black hole, such a value for its mass and how rapidly it is spinning. The robust and unusual prediction of rapidly declining X-ray emission and very slowly declining ultra-violet emission from these discs is borne out in the observations. Finally, I will highlight some recent work which has led to exact, very simple analytic solutions for plunging orbits close to the black hole, and will speculate on how these orbits may also be useful to the detailed description of emission from the accretion disc.

Join via ZOOM at:

<https://uoc-gr.zoom.us/j/81812392478?pwd=RWVjcUJ2ZXVyWUIHM2E5TzJQNHIUQT09>