

Nomen non est omen: why it is too soon to identify ultra-compact objects as black holes

Sebastian Murk, Okinawa Institute of Science and Technology

Black holes play a pivotal role in the foundations of physics, but there is an alarming discrepancy between what is considered to be a black hole in observational astronomy and theoretical studies. Despite claims to the contrary, I will argue in this talk that identifying the observed astrophysical black hole candidates as genuine black holes is not justified based on the currently available observational data, and elaborate on the necessary evidence required to support such a remarkable claim. In addition, I will discuss whether the predictions of semiclassical gravity are equally compatible with competing theoretical models, and illustrate why semiclassical arguments may favor horizonless configurations.