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Dynamics of the candidate SMBH-IMBH system ASASSN-20qc exhibiting a quasiperiodic UFO

Tuesday, 9 July 2024 17:40 (20 minutes)

The recently reported transient event ASASSN-20qc (Pasham et al., 2024), which was revealed first by the optical outburst and then the delayed soft X-ray emission, was shown to exhibit a quasiperiodic ultrafast outflow. I will show using analytical as well as numerical calculations (see also the contribution by Petra Sukova) that such a behaviour is consistent with the intermediate-mass black hole (IMBH, mass range~100-10000 Solar masses) orbiting the supermassive black hole (SMBH) on an inclined orbit. The remaining puzzle is the origin and the likelihood of such systems. Using the typical characteristics and the history of dense nuclear star clusters, I will analyze the dynamical origin of such an IMBH. It is also plausible that the IMBH is a remnant core of a tidally dissolving stellar cluster. In that case, the optical TDE-like outburst ASASSN-20qc would be a direct consequence of the IMBH-star binary break-up in the vicinity of the SMBH, i.e. it would be the manifestation of the final stages of the dissolution of a star cluster hosting an IMBH. I will provide estimates of the rates of such events in the nearby Universe.

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