

第182回エンレイソウの会 日本物理学会北海道支部講演会

場 所： 北海道大学理学部大学院講義室（2号館 - 211）

日 時： 2012年12月27日（木曜日） 13:00～14:00

講演者： Dr. Kimitake Hayasaki
(Korea Astronomy and Space Science Institute)

題 目： 『Tidal disruption flares from stars on eccentric orbits』

要 旨： We study tidal disruption and subsequent mass fallback process for stars approaching supermassive black holes on bound orbits, by performing three dimensional Smoothed Particle Hydrodynamics simulations with a pseudo-Newtonian potential. We find that the mass fallback rate decays with the expected $-5/3$ power of time for parabolic orbits, albeit with a slight deviation due to the self-gravity of the stellar debris. For eccentric orbits, however, there is a critical value of the orbital eccentricity, significantly below which all of the stellar debris is bound to the supermassive black hole. All the mass therefore falls back to the supermassive black hole in a much shorter time than in the standard, parabolic case. The resultant mass fallback rate considerably exceeds the Eddington accretion rate and substantially differs from the $-5/3$ power of time. We also show that general relativistic precession is crucial for accretion disk formation via circularization of stellar debris from stars on moderately eccentric orbits.

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