Contribution ID: **26** Type: **Talk**

Evolution of wandering intermediate-mass black holes in high-z galaxies with 3D radiation hydrodynamics simulations

Saturday 24 June 2023 12:04 (18 minutes)

We have, for the first time, successfully performed three-dimensional radiative hydrodynamics simulations of the gas accretion onto intermediate-mass (IMBHs) black holes wandering in the high-z galaxies. Here the sublimation of the dust grain caused by the radiation from the accretion disks around IMBHs is taken into consideration. We found that the accretion rate and acceleration are $\sim 7 \times 10^{-6} M_{\odot} \mathrm{yr}^{-1}$ and $\sim 10^{-8} \mathrm{cm\,s}^{-2}$ in environments with relatively high density ($\geq 10^{4} \mathrm{cm}^{-3}$) and low metallicity ($0.1 Z_{\odot}$). These results suggest that IMBHs keep floating in the galactic disk with insignificant mass growth. For extremely high density ($\geq 10^{6} \mathrm{cm}^{-3}$), as suggested by recent observations from the James Webb Space Telescope, the accretion rate and acceleration rise significantly. This indicates that IMBHs are ejected from the galactic disk due to an increase in mass and velocity.

Primary author: Ms OGATA, Erika (University of Tsukuba)

Co-authors: OHSUGA, Ken (University of Tsukuba); Prof. FUKUSHIMA, Hajime (University of Tsukuba); Prof. YAJIMA, Hidenobu (University of Tsukuba)

Presenter: Ms OGATA, Erika (University of Tsukuba)

Session Classification: Simulations of accretion and outflow near black holes