

JADES census of high redshift AGN - probing the origin and growth of the first black holes

Tuesday 19 November 2024 15:30 (20 minutes)

The origin and evolution of supermassive black holes as well as their interaction with their host galaxies still holds many unanswered questions such as the uncertainty surrounding the seeding and growth of the first supermassive black holes embedded in first galaxies. The launch of JWST was expected to shed more light on this domain by probing the low mass, low luminosity end of the active galactic nuclei (AGN) distribution - a regime missed by previous all sky surveys which were sensitive only to the brightest objects. However, the first year of results has revealed some peculiar properties of this low luminosity AGN population. Among the more notable ones being their offset compared to the local black hole mass - stellar mass relation and significant X-ray weakness. In this talk I will present first results from the search for broad line AGN in the JADES survey, showcasing a robust sample of Type 1 AGN spanning redshifts from 2 to 7, commenting on their black hole masses, accretion rates and the properties of their host galaxies. I will also focus on a unique system at $z \sim 6.6$ in which we discover an over massive AGN residing in a quiescent system, accreting at only $\sim 2\%$ of Eddington luminosity. With a BH mass of $5 \times 10^8 M_{\text{sun}}$ residing in a galaxy with a stellar mass of $\sim 2 \times 10^9 M_{\text{sun}}$, this is one of the most over massive black holes for its host galaxy in JADES survey and provides compelling evidence of super-Eddington bursts occurring during early black hole growth. In addition, I will talk about potential resolutions to X-ray weakness displayed by many JWST-selected high redshift AGN by presenting a $z = 2.3$ QSO with L_{bol}/L_x ratio in excess of 15000 and strong absorption features in the broad Balmer and HeI10830 lines implying $N_H > 10^{24} \text{ cm}^{-2}$. Such absorption features are also present in some $z > 4$ AGN of our sample, suggesting Compton-thick medium present in many early AGN.

Presenter: JUODŽBALIS, Ignas (University of Cambridge)