



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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A universal model of black hole accretion uncovering AGN in the Cosmic X-ray background

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From observations of active galactic nuclei (AGN) we may improve our understanding of the growth of black holes across cosmic time and their impact on their host galaxies, but observations alone may be limited by complex biases. Here I will present the results from modeling the whole AGN population while accounting for observational biases.

I will begin by showing that the Eddington ratio distribution for optically-selected AGN is consistent with a broad power-law that is independent of host galaxy type or age. This broad Eddington ratio distribution is also observed in the X-rays, suggesting that a universal Eddington ratio distribution may be enough to describe the full AGN population. From these results, I have expanded a new semi-numerical galaxy formation simulation with a straightforward prescription for AGN accretion. I will show that this simple model for AGN accretion can broadly reproduce the observed properties of X-ray AGN host galaxies and halos. I also find a trend between Eddington ratio distribution and redshift, consistent with the behavior predicted by hydrodynamic simulations.

Finally, I will describe a new synthesis model for the Cosmic X-ray Background based on this semi-numerical model and present our results investigating the physical properties of the AGN population and their host galaxies and halos that contribute to this background emission.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Primary author: JONES, Mackenzie (Center for Astrophysics | Harvard & Smithsonian)

Presenter: JONES, Mackenzie (Center for Astrophysics | Harvard & Smithsonian)

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