

Abstract Submitted  
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**Tracing the Origin of Black Hole Accretion Through Numerical Hydrodynamic Simulations**<sup>1</sup> SANDY SPICER, Siena College, RACHEL SOMERVILLE, Rutgers University, Center for Computational Astrophysics at the Flatiron Institute, ENA CHOI, Rutgers University, Columbia University, RYAN BRENNAN, Rutgers University — It is now widely accepted that supermassive black holes co-evolve with galaxies, and may play an important role in galaxy evolution. However, the origin of the gas that fuels black hole accretion, and the resulting observable radiation, is not well understood or quantified. We use high resolution "zoom-in" cosmological numerical hydrodynamic simulations including modeling of black hole accretion and feedback to trace the inflow and outflow of gas within galaxies from the early formation period up to present day. We track gas particles that black holes interact with over time to trace the origin of the gas that feeds supermassive black holes. These gas particles can come from satellite galaxies, cosmological accretion, or be a result of stellar evolution. We aim to track the origin of the gas particles that accrete onto the central black hole as a function of halo mass and cosmic time. Answering these questions will help us understand the connection between galaxy and black hole evolution.

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