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ABSTRACT ONLY

COSMOLOGICAL MASS TRANSPORT ON GALACTIC NUCLEI AND THE FORMATION OF HIGH REDSHIFT QUASARS.

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By using AMR cosmological hydrodynamic N-body zoom-in simulations, with the RAMSES code, we studied the mass transport processes onto galactic nuclei from high redshift up to z=6. Due to the large dynamical range of the simulations we were able to study the mass accretion process on scales from 50[kpc] to few 1[pc]. We studied the BH growth set on the galactic center in relation with the mass transport processes associated to both the Reynolds stress and the gravitational stress on the disc. Such methodology allowed us to identify the main mass transport process as a function of the scales of the problem. We found that in simulations that include radiative cooling and SNe feedback, the SMBH grows at the Eddington limit for some periods of time presenting a $f_{EDD} \sim 0.5$ through out its evolution. The alpha parameter is dominated by the Reynolds term, α_R, with $\alpha_R >> 1$. The gravitational part of the alpha parameter, α_G, has an increasing trend toward the galactic center at higher redshifts, with values $\alpha_G \sim 1$ at radii $<$ few 10^1[pc] contributing to the BH fueling. In terms of torques, we also found that gravity has an increasing contribution toward the galactic center at earlier epochs with a mixed contribution above 100 [pc]. This complementary work between pressure gradients and gravitational potential gradients allows an efficient mass transport on the disc with an average mass accretion rates of the order few [M_{sun}/yr]. This level of SMBH accretion rates found in our cosmological simulation are needed in all models of SMBH growth attempted to explain the formation of redshift 6-7 quasars.

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