Co-Evolution of Central Black Holes and Galaxies
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SMBH Luminosity in the Starburst Environment

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We claim that in the starburst environment there is no accretion of the ISM onto the BH and thus, in such cases, the BH luminosity is regulated by the mass-loss rate from massive stars in the star forming region. We calculate the accretion rate and show that it is usually small during the superwind stage and grows at the post-starburst stage, when the matter reinserted by intermediate–mass stars remains gravitationally bound and fuels the central BH.

Figure 1 presents the results from hydrodynamic calculations of gas accretion onto a central SMBH embedded in a massive star-forming region. An exponentially decaying starburst with an initial intensity SFR_0 and an e-folding time $\tau_{\rm SF}$ is assumed. During the SNe stage, the superwind

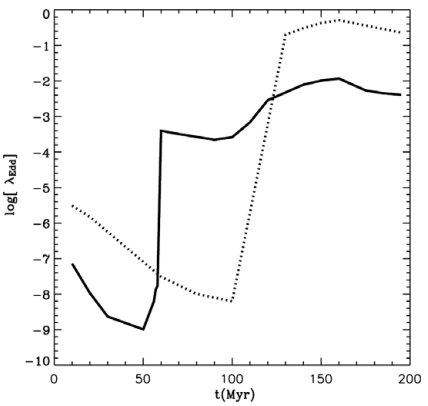

Figure 1. Time evolution of the Eddington ratio for a $10^7\,M_\odot$ SMBH embedded into a $10^9\,M_\odot$, $R_{\rm SF}=50\,$pc nuclear star-forming region. Solid and dotted lines present the results for starbursts with $SFR_0=10\,M_\odot\,{\rm yr}^{-1}$, $\tau_{\rm SF}=2\,$Myr and $SFR_0=100\,M_\odot\,{\rm yr}^{-1}$, $\tau_{\rm SF}=10\,$Myr, respectively.

removes most of the matter reinserted by massive stars (see Silich *et al.* 2008), which results into negligible accretion rates. The accretion rate grows rapidly when the superwind stage decays and is replaced by a gravitationally bound regime that is dominated by intermediate-mass stars. This leads to a time delay (Davies *et al.* 2007) between the beginning of a starburst and the emergence of the AGN. The value of the lag time depends on the characteristic timescale $\tau_{\rm SF}$ of the starburst phase.

References

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