

CAN AGN (ACTIVE GALACTIC NUCLEI) ALONE MAKE THE COSMIC X-RAY BACKGROUND?

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Recent ROSAT X-ray observations of AGN have yielded important new information[1] about the analytic structure of the AGN X-ray luminosity function and its evolution out to $z = 3$. Using the luminosity evolution obtained within the cosmological context of $\Omega=0$, we find[that AGN could readily make up the CXB (cosmic X-ray background)[2,3,4]. However, in this case we find that accounting for the CXB with accretion-powered AGN emission is incompatible with the observed mass function for present-epoch black hole galactic nuclei (both active and dormant)[5]. On the other hand, we find that the luminosity evolution obtained with ROSAT for such AGN within the cosmological context of $\Omega=1$ is indeed compatible with the present-epoch black hole galactic nuclei mass function. This apparently acceptable solution, though, definitely falls short of accounting for all the CXB, even when considering unified models for AGN. This difficulty can be resolved by noting that the underlying supermassive black holes which already exist at the onset of the canonical AGN phenomenon of supply-limited accretion must have undergone a previous growth phase where the accretion would be expected to be Eddington-limited. In this likely scenario (i.e., for $\Omega=1$) the residual CXB, that over and above the foreground of canonical AGN, can be naturally explained by the characteristic X-ray emission from highly compact PAG (precursor active galaxy) sources associated with these numerous black holes, at redshifts just beyond the earliest AGN[6].

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