

The early growth of super-massive black holes as seen by Chandra

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Deep X-ray surveys provide unprecedented access to the population of accreting super-massive black holes (SMBH) at high redshift. I will present our recent results (Vito et al. 2018) on the $3 < z < 6$ AGN population in the 7 Ms CDF-S and 2 Ms CDF-N, the deepest X-ray surveys to date. We put tight constraints on quantities such as the obscured AGN fraction and the number density of $z > 3$ AGN. In particular, we derived a large fraction (50-80%) of heavily-obscured ($\log N_H > 23$) AGN, which does not evolve significantly from $z=3$ to 6 but shows a positive dependence on luminosity. Although this was already suggested by previous works, thanks to the use of the deepest X-ray data available we could investigate this behavior down to $\log L \sim -42$. I will show our findings on the high-redshift AGN X-ray luminosity function, focussing in particular on the slope of the faint end, accessible only by the deepest X-ray surveys. This is particularly important to assess the contribution of AGN to the cosmic reionization. All of these results will be placed in the context of SMBH seeds formation and growth. I will also discuss how future missions like Lynx, Athena and JWST will boost our knowledge of the SMBH formation and evolution in the early universe. Finally, I will present preliminary results on a sample of QSOs at $z=6-6.8$ with black-hole mass ($2-40 \times 10^8 M_{\text{sun}}$) estimated from near-IR spectroscopy observed with Chandra. Some of these are among the faintest optically-selected QSOs targeted in X-rays at $z > 6$, lying a few times below the knee of the high-redshift QSO luminosity function.

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