Looking for the sources of Reionization at the Edge of the Universe

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Abstract

Establishing the number density of faint AGNs at $z > 4$ is crucial to understand their role as main contributors to the Reionization of the Universe. We have selected 45 faint ($H < 27$) AGN candidates at $z > 4$ in the CANDELS GOODS-South, GOODS-North and HUDF fields thanks to the extensive multi-wavelength and ultra-deep data-sets from Chandra, HST, VLT, LBT and Spitzer. We have adopted a relatively novel selection criterion: AGN candidates with robust photometric redshifts at $z > 4$ are detected in the WFC3 H160-band, which corresponds to the rest frame UV luminosity, and are selected thanks to their unambiguous emission in the ultra-deep X-ray images by Chandra at a level of $L_X > 10^{43-44}$ erg/s. We have derived the UV-luminosity function of AGNs at $z > 4$ at $M_{1450} < -23$, in the luminosity regime typical of the local Seyfert galaxies. The AGN luminosity function shows a steep slope at the faint end. The selected AGN population can produce at z=4-6 a photoionization rate which is consistent with what is required to keep the inter galactic medium highly ionized, as observed in the Lyman-alpha forest of high-z QSOs. This faint AGN population at high-z can thus provide a significant contribution to the Reionization of the Universe.