

Multi-wavelength studies of obscured AGN in the CDF-S

V. Mainieri¹, P. Rosati², P. Tozzi³, M. Dickinson⁴, R. Gilli², G.
Hasinger¹, K.I. Kellermann⁶

¹ *Max-Planck-Institut fuer extraterrestrische Physik*

² *European Southern Observatory*

³ *INAF Osservatorio Astronomico di Trieste*

⁴ *NOAO*

⁵ *INAF Osservatorio Astronomico di Bologna*

⁶ *NRAO*

Abstract

We present a detailed multi-wavelength analysis of the population of absorbed AGN in the Chandra Deep Field South. This field is ideal for the quality of the available data at almost all wavelengths. The still unresolved fraction of the X-ray background which increases at $E > 6$ keV, it is probably due to a significant population of strongly absorbed, possibly Compton-thick sources, preferentially at $z < 1$. Through a detailed X-ray spectral analysis of the X-ray sources in the CDF-S, we demonstrated that at least part of these population can be accounted for in deep X-ray surveys when all the X-ray sources are included (thanks to the use of accurate photometric redshifts for the still unidentified ones). In particular 14 sources have a pure reflection X-ray spectrum, typical of Compton-thick sources ($N_H > 1.5 \times 10^{24} \text{ cm}^{-2}$), which we can convert in a surface density as high as $(200 \pm 50) \text{ deg}^{-2}$. We then used radio (VLA 20 cm) and Spitzer (IRAC and MIPS) observations of the central part of the CDF-S field (GOODS area) to select absorbed AGN candidates, comparing our results with the different selections criteria proposed in the literature in the recent past. We will particularly stress the amount of overlap between the radio-midIR selected population of absorbed AGN and the X-ray selected absorbed AGN. We will present the reconstructed SED of all the AGN in the radio-midIR sample using the available photometry from the radio to the X-ray. We will finally summarize our work presenting our current best estimate of the intrinsic N_H distribution of AGN.