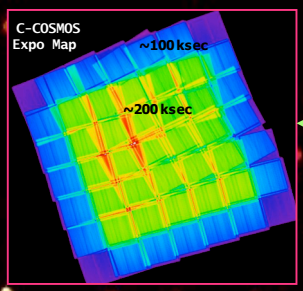
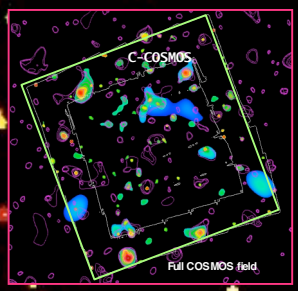
Multiwavelength Identification of Chandra COSMOS X-ray sources

Civano F. (CFA), Elvis M. (CFA), Brusa M. (MPE), Comastri A. (INAF-OABo), Fiore F. (INAF-OAMp), Mainieri V. (ESO), Zamorani G. (INAF-OABo), Vignali C. (Uni-Bo), Cappelluti N. (MPE), Puccetti S. (ASDC-ASI), Fruscione A. (CFA), Aldcroft T. (CFA) and the C-COSMOS collaboration

C-COSMOS survey

- o Cycle 8 proposal
- o 1.8 Ms exposure time
- o 200 ksec average exposure
- o 0.9 sq deg
- o F_{lim}~2×10^{-16} cgs (0.5-2 keV)
- o probability threshold 2×10^{-5}
- o 1760 sources (0.5-7 keV)





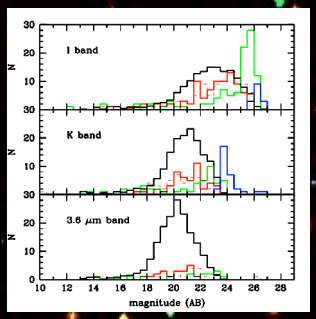
Multiwavelength identification

Likelihood ratio technique described by Sutherland & Saunders (1992) and successfully used by other authors (Ciliegi et al. 2003; Brusa et al. 2005,2007).

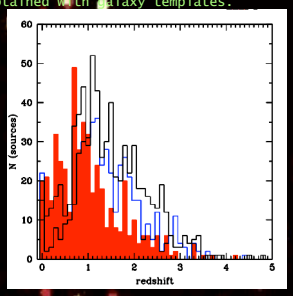
IDENTIFICATION RATE

	I	K	3.6μm
Secure id.	84.8%	89.9%	95.3%
Ambiguous id.	7.9%	2.7%	1.1%
Sub-threshold id.	5.7%	2.6%	0.9%
Blank sources	4.4%	3.1%	2.7%
Faint sources	0.8%	1.7%	

Magnitude distribution of the counterparts of X-ray sources. Black - secure sources; red - ambiguous sources; green - sub threshold sources; blue - faint sources.

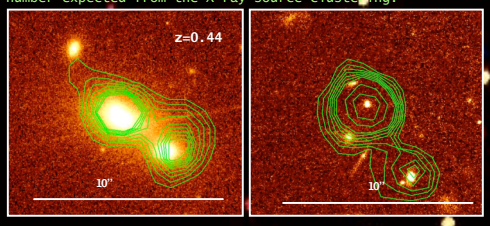


Redshift distribution
467 good quality spectroscopic redshifts (red) from VIMOS/VLT and IMACS/Magellan; ~950 photometric redshifts either from Salvato et al. 2008 for XMM-COSMOS sources (blue) or from Ilbert et al. 2008 (black) obtained with galaxy templates.



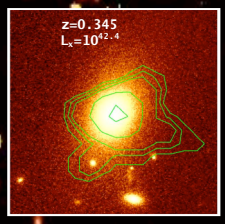
Close pairs

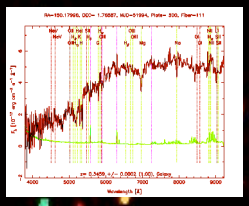
Thanks to the high resolution and the good Chandra PSF, a total of ~80 sources closer than 12" are present in the X-ray catalog. Next step is to obtain the spectroscopic identification of all of them in order to verify the fraction of physical pairs, and to compare it with the number expected from the X-ray source clustering.



XBONGs

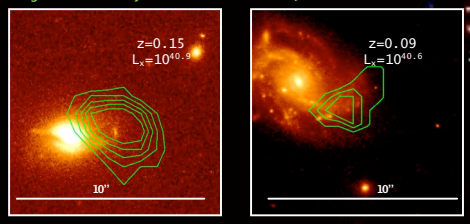
X-ray bright optically normal galaxies are relatively luminous (10^{41}-10^{42} cgs)
X-ray sources characterized by an optical spectrum without evidence of accretion driven activity.
They take away the ~5% of the sources in the X-ray surveys.
Several explanations have been proposed to expound the lack of nuclear emission as for example the presence of circumnuclear dust that prevents the ionization of the narrow line regions (e.g., Civano et al. 2007).





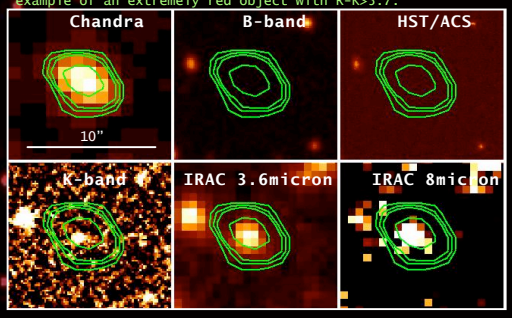
OFF-NUCLEAR objects

The Chandra PSF allows to discriminate between AGN and off-nuclear starburst or ultra luminous X-ray objects (ULX). Two examples out of a sample of ~30 possible off-nuclear sources down to redshift 0.5 are shown (ACS images with X-ray contours overlaied).



Obscured AGN

The combination of depth and area of C-COSMOS with the multiwavelength database of the COSMOS survey is suitable to find high luminosity obscured objects (QSO2) at high redshift. They are usually characterized by high x-ray to optical flux ratios (lg(X/O)>1) and by red optical-to-near-infrared colors. The most extreme of them (EXOs) emerge only at the IRAC wavelengths. The object below is an example of an extremely red object with R-K>5.7.



Cosmic Evolution Survey
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Francesca Civano fcivano@cfa.harvard.edu
Post-doc at the
Harvard-Smithsonian Center for Astrophysics