Medium sample VO data publishing: a user's report

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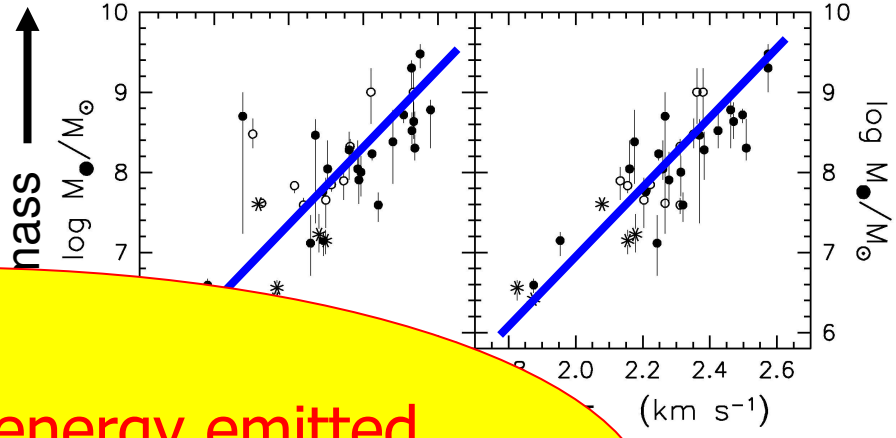
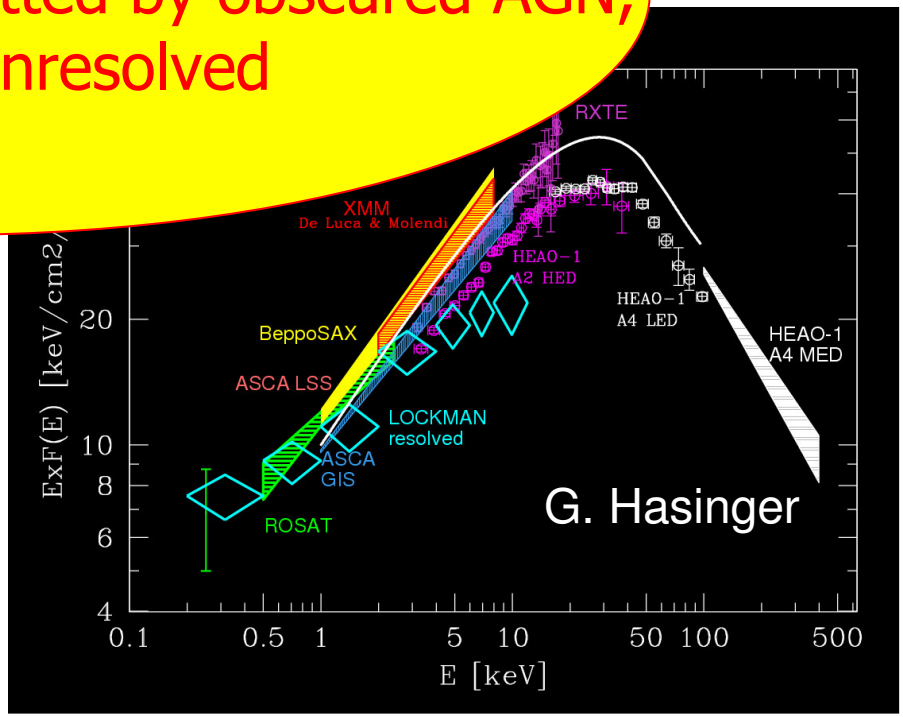
Galaxy formation and obscured accretion

- Relation between AGN evol. and galaxy formacion:
  - Most (all) galaxies host a BH with (0.4-0.6)% of their bulge mass
  - Evol. star formati…
    emission…
- X-ray …
  - Isot…
  - SED ma…
  - Sum of radiation … accretion throughout history of Universe
- Almost totally resolved < 8 keV:
  ⇒ Most of BH growth in "obscured mode"



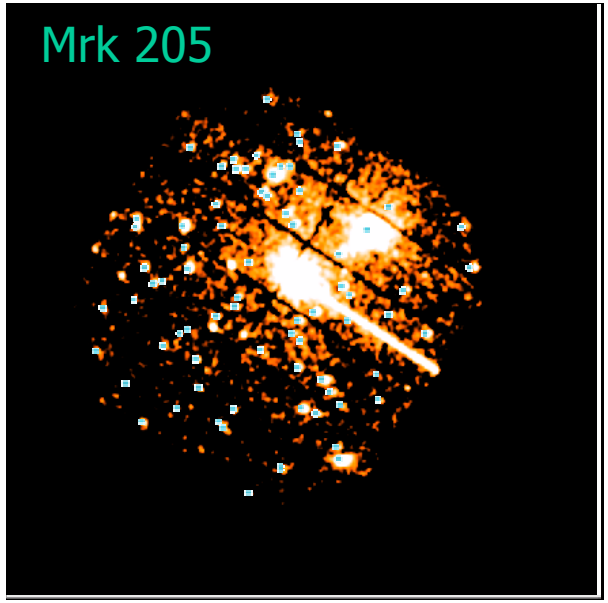
A large fraction of energy emitted by accretion into BH is emitted by obscured AGN, and it is still unresolved

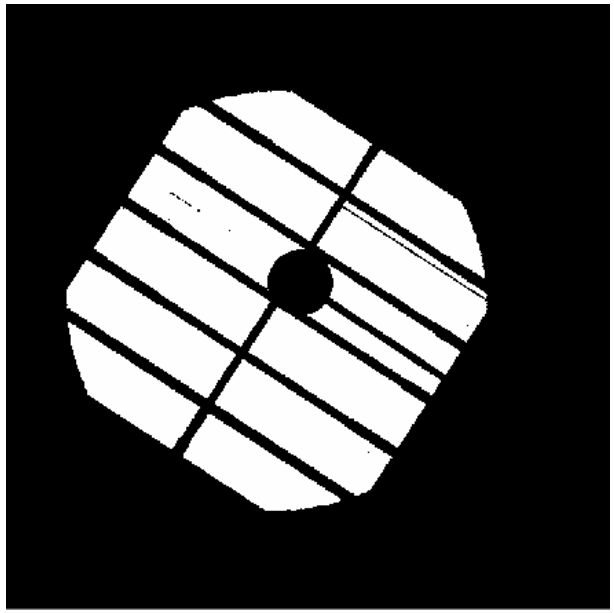


AXIS/XMS: X-ray surveys of xgal sky

Carrera+07, Barcons+07

- 25 XMM-Newton target fields:
  - Galactic latitude |b|>20 deg (extragalactic)
  - Good quality (long expos...)
  - Very detailed source screening
- Solid angle ~3.3 deg^2





The XMS samples Barcons+07

- Defined in four bands: soft, hard, XID, ultra-hard
  - Flux limited in Soft, Hard and XID
- Total of 319 sources

Name	Band (keV)	Flux limit 10^{-14} cgs	# sources (unique)	# identified (fraction)
Soft XMS-S	0.5-2	1.5	211 (1)	202 (96%)
Hard XMS-H	2-10	3.3	160 (20)	134 (84%)
XID XMS-X	0.5-4.5	2.0	285 (56)	264 (93%)
Ultrahard XMS-U	4.5-7.5	-	71 (2)	61 (86%)

Optical identification of the XMS

- Optical imaging: g,r,i (SDSS), Z (Gunn), mostly at the INT/WFC to r~23-24^{mag}
- Reliable & unique candidate counterpart in r/i for virtually all sources (< 5" or < 5σ): only 8 "empties"
- Optical spectroscopy
  - 50% from AXIS programme (WHT, TNG, NOT): multi-fibre and long-slit spectroscopy
  - 20% from Calar Alto/3.5m long-slit spectroscopy
  - 15% from VLT/FORS2 long-slit spectroscopy
  - A few from AAT/2dF, SUBARU/FOCAS, SAO and others

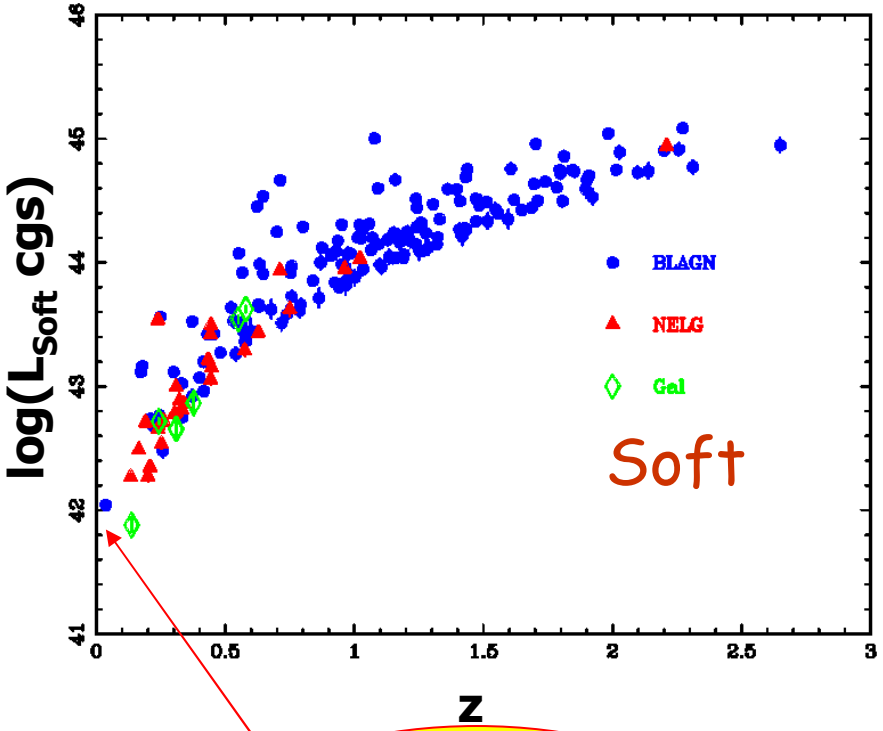
Breakdown of identified sources

+2 BL Lacs

	XMS-S **Soft**	XMS-H **Hard**	XMS-X XID	XMS-U Ultrahard
Broad-line AGN	**75%** (152/202)	**65%** (87/134)	74% (195/264)	69% (42/61)
Narrow-line galaxies (AGN)	**13%** (26/202)	**25%** (35/134)	14% (38/264)	25% (15/61)
Absorption line galaxies+clust	**3%** (7/202)	**6%** (8/134)	3% (9/264)	3% (3/61)
Stars	**7%** (15/202)	**2%** (3/134)	8% (20/264)	0% (0/61)

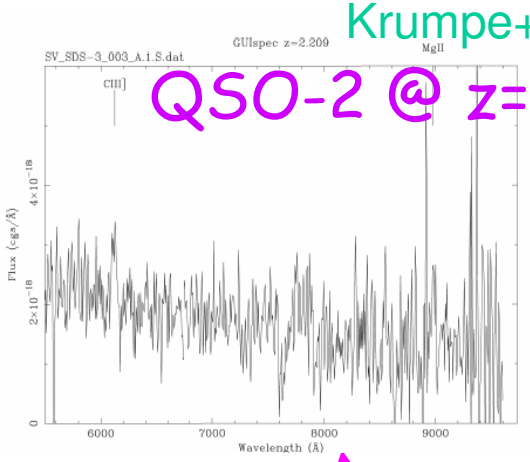
Clear differences between Soft/XID and Hard/Ultrahard –selected samples

Luminosities and *redshifts*

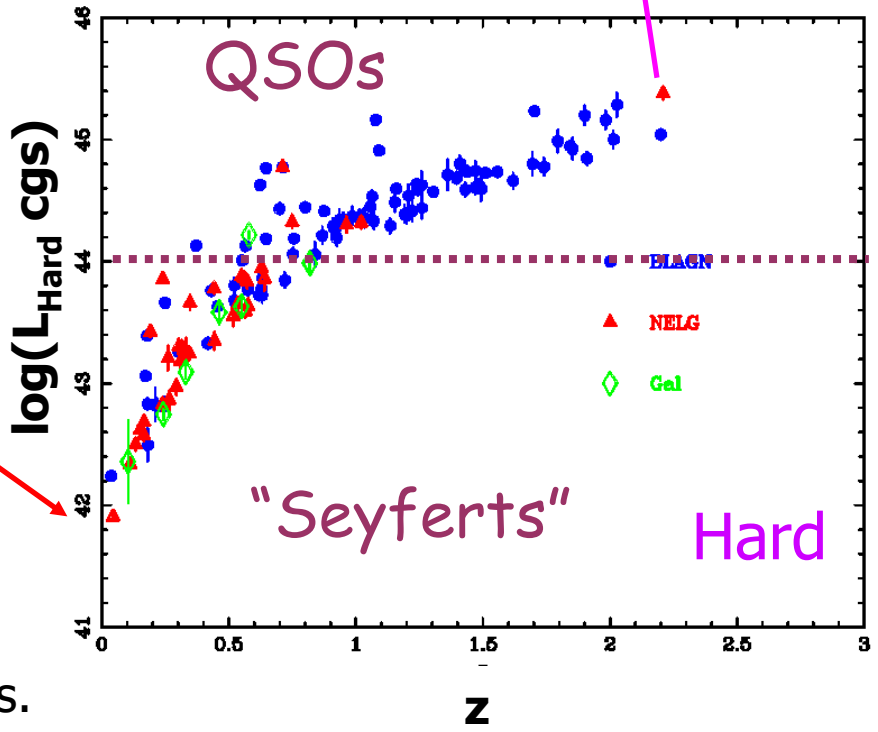


Krumpe+07

QSO-2 @ z=2.2



All gals. consistent with being obscured AGN



Some of the NELGs have line rations typical of STB gal. (Barcons+)

All unID sources are opt. extended: also gals.

XMS products

- X-rays (Carrera+07, Barcons+07):
  - Source lists: positions, fluxes, hardness ratios
- Optical (Barcons+07):
  - Magnitudes (gri, R, I...), opt. extent
  - ID information: type, redshift
  - Spectra (IRAF/FITS, ASCII)
  - [Images (CASU)]

- Access:
  - So far, web pages
    - ASCII files (tables and espectra) and FITS files (spectra)
  - VO (#39 in Mark Allen's list)

Getting the XMS into the VO

- Building from MTC experience in DCA workshop
- Simplest input:
  - Source list with several columns
  - Optical spectra in "standard" format (IRAF/FITS)

- Source list easy to get into "correct" VO format (FITS)
- Spectra need to be into FITS file (format ~ X-ray spectra)
  - How?
  - Are there any tools to do this?
  - Standards for quality flags?

- First step: create databases
  - We are using Saada (version 1.5beta)
    - Very valuable cooperation from L. Michel
    - But hence really "state of the art"
  - DB created for sources and spectra sepparately
    - No documentation on how to relate them
  - Use of alternative tools?
    - See Nick Walton's talk

Our experience

- Loads of tools
  - Difficult to discriminate (even after workshops)
  - But not some basic ones
- State of the art, willing cooperation, but:
  - Work in progress
  - Incomplete documentation
- Non-trivial (but vital) tasks difficult
  - Cross-relations
  - Coverage...