XJET: X-RAY EMISSION FROM EXTRAGALACTIC RADIO JETS:
http://hea-www.harvard.edu/XJET/

F. Massaro¹, D. E. Harris¹, C. C. Cheung²
¹ Harvard, Smithsonian Astrophysical Observatory, Cambridge, MA, USA ² Astrophysics Science Division, NASA/GSFC, Greenbelt, MD, USA

email: fmassaro@head.cfa.harvard.edu

1 The project

- XJET is an on-line catalogue of extragalactic radio sources with published X-ray detections of jet knots and hotspots.
- As of June 2011, there are 115 sources in the list. Of these, only 6 were previously known from the Einstein and ROSAT missions (3C120, 3C273, M87, Cen A, Cyg A, NGC6251); Chandra has been responsible for all the detections since.
- An individual page for each source is linked from the main page and includes a picture(s), and links to NED and published reference(s).
- Links to publicly accessible FITS images are provided, when available. Contributions and suggestions welcome.

2 Introduction

This website is meant to serve as a clearing house for radio galaxies and quasars for which X-ray emission has been detected which is associated with radio jets, i.e. knots and hotspots. Since 2009 we are adding a suite of fits files for each source consisting of flux maps in 3 X-ray energy bands together with an event file which has had pixel randomization removed and also been registered so that the nuclear emission is aligned with the radio nucleus to within approximately 0.1 arcsec. We also provide the radio map used for registration.

3 Photometry

In our past work on M87 and other sources, we have found a useful reduction procedure is to remove pixel randomization. We normally choose 3 energy bands and create fluxmaps (in units of erg cm⁻² s⁻¹ pixel⁻¹) by dividing the data by an appropriate exposure map. Photometry then consists of measuring the flux directly for any given spatial region, and measuring the mean energy of the events in that same region with the same energy bands so that a flux correction can be made for each source component.

Since the energy bands are not very large, the choice of the spectral index ($\alpha$, which is defined by flux density, $S_\nu \propto \nu^{-\alpha}$) required to convert fluxes into flux densities, is not very critical. Thus photometry on the flux maps can yield flux densities for use in constructing broad band spectra.

4 Current Status

- Our inventory spans a wide range of redshift from the closest jet in Centaurus A to the most distant knot detected in the quasar 1508+572 that lies at z=4.3. In addition, the sources in the catalog belong to several different classes of AGNs: going from FR I and FR II radio galaxies to Seyfert galaxies, Core Dominated and Lobe Dominated quasars and BL Lacs.

5 Aims

We plan to use archival Chandra data on X-ray jets to produce a uniform set of products for community use and to perform a critical test of morphological changes between bands in order to constrain the X-ray emission processes. Our study will give us a unique data set to parameterize the X-ray jet properties such as: the distance between the AGN core and the onset of the X-ray emission, the length of the X-ray emitting jet segment, and the ratio between X-ray and radio power. We will to explore the correlation of these properties with other source characteristics, e.g., total source luminosity, radio-power, and redshift of the source.

Acknowledgments

The XJET website is partially supported by NASA grant AR6-7013X and NASA contract NAS8-50075. F. Massaro acknowledges the Foundation BLANCEFLOR Boncompagni-Ludovisi for the grant awarded him in 2009 and 2010 to support his research at SAO.