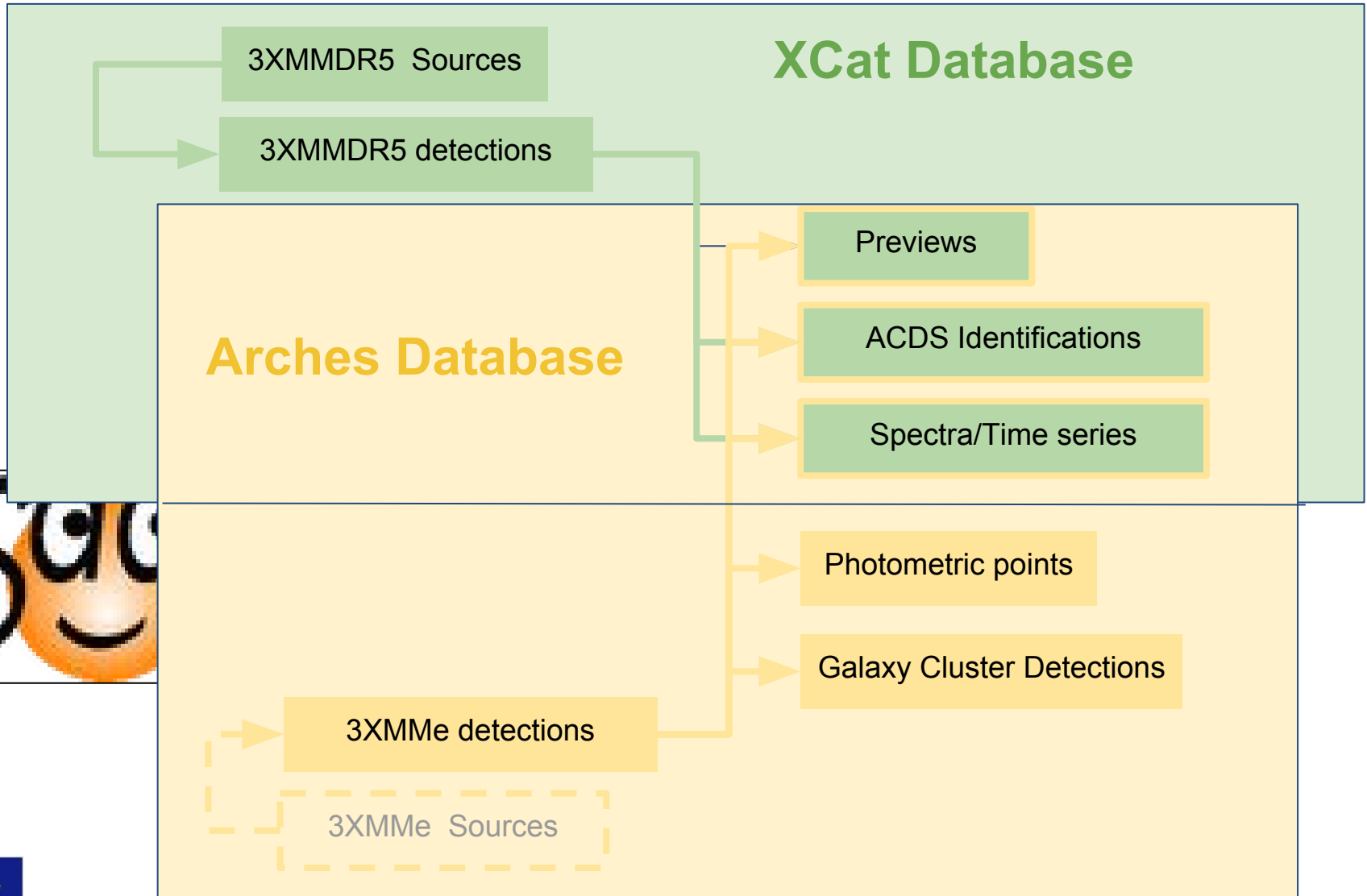


Hands-on Session: Arches Database
Laurent Michel

What is the Arches Database

- **Extension of the 3XMM dataset/database**
 - The same data corpus
 - The same features
- **Content**
 - The EPIC data provided by the XMM pipeline
 - Catalogue
 - Previews
 - Possible identifications
 - Spectra and time series
 - Arches deliverables
 - 3XMMe catalogue
 - XMatched catalogue
 - SEDs + previews
- **Features**
 - The same as for the XCatDB plus some specific filters

Shared Data



Design Baseline

- **Facilitating data evaluation with the naked eye**
 - Highlighting source features
 - No tabular presentation
- **Processing very complex queries**
 - Query edition either by hand or by graphical widgets
 - A query language reasonably human readable
 - No limit on the number of constraints
 - Constraint on associated data
- **Interoperability**
 - Query results can be send to external VO clients (SAMP)
 - EPIC spectra can be fitted with XSpec
 - Shopping cart facility to download multiple data selections in one shot

3 Main Panels

Filter Detections by

Position | Detection Parameters | Source Parameters | Related Products | Arches Data | Spectral Fits

Correlations with Arch. Src.

Cone Search Setup

CoordName

Radius(arcmin)

System

Draw a Search Region | Upload Position List

Query Panel

Query Editor

Submit Result Limit 1000

Select ENTRY From EnhancedEntry In Enhanced Limit 1000

Widgets do not reflect the query anymore after you modified it directly

Source Detail

3XMM J130601.6+180143 13:06:01.63+18:01:44.0

Observation - Unique Detection Parameters

Obs. Parameters	Unique Source Parameters	Position
Observation ID	0017940101	13:06:01.63+18:01:44.0
Target	GP Com	Error on Position (arcsec)
Pointing (2000)	13:05:42.09+18:02:37.1	2.7862
Principal Investigator	Dr Christopher Mauche	Flux (erg/cm/s)
Observation Start	3/1/2001 13:52:46	2.28E-14
Observation End	4/1/2001 4:7:18	Hardness Ratio 1
Revolution	0196	0.1952+0.1170
Processing Date	2012-12-23T11:34:56	Hardness Ratio 2
		-0.3242+0.1162
		Hardness Ratio 3
		-0.1880+0.1781
		Hardness Ratio 4
		-1.0000+0.2833
		Detection Max likelihoods
		77.8463
		Variability Flag
		false
		Number of Detections

Image Gallery

- EPIC Data
- Fluxes per Band
- Hardness Ratio
- Spectra - Time Series
- ARCHES Photometric Points
- ARCHES Cluster Finder Output

Selection of Individual Detections

3XMM J130601.6+180143 (id=200179401010065)

13:06:01.63+18:01:44.0 ± 2.7762arcsecarcsec [More...](#)

Observation 0017940101 3/1/2001 13:52:46

Good detection (0) Ext. Source(13.4883")

Det ML 77.8463 (0.2 12keV) Not variable

2.28E-14 ± 5.21E-15 erg/sec/cm2 (0.2 12keV)

368 ± 36 counts

HR1 0.1952 HR2 -0.3242 HR3 -0.1880 HR4 -1.0000

SED | Arches FC | EP 0.2-12KeV | EPw 0.2-12KeV | CA FChart

Possible Source Identifications

3XMM J145009.1+090437 (id=200575603010035)

14:50:09.07+09:04:39.0 ± 1.6697arcsecarcsec [More...](#)

Observation 0057560301 9/8/2001 3:49:52

Good detection (0) Ext. Source(11.8004")

Det ML 223.1480 (0.2 12keV) Not variable

5.10E-14 ± 1.55E-14 erg/sec/cm2 (0.2 12keV)

655 ± 43 counts

HR1 0.3887 HR2 -0.0102 HR3 -0.88 HR4 -1.0000

SED | Arches FC | EP 0.2-12KeV | EPw 0.2-12KeV | CA FChart

Possible Source Identifications

Query setup

Filter Detections by

- Position
- Detection Parameters
- Source Parameters
- Related Products
- Archives Data
- Spectral Fits
- Correlations with Arch. Srr

Cone Search Setup

Coord/Name

List of Active Constraints

...n to append,
...e list

Query Panel

SUBMIT Result Limit

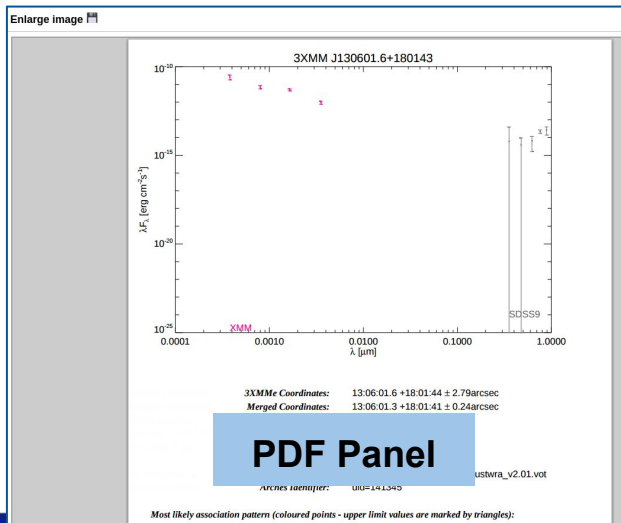
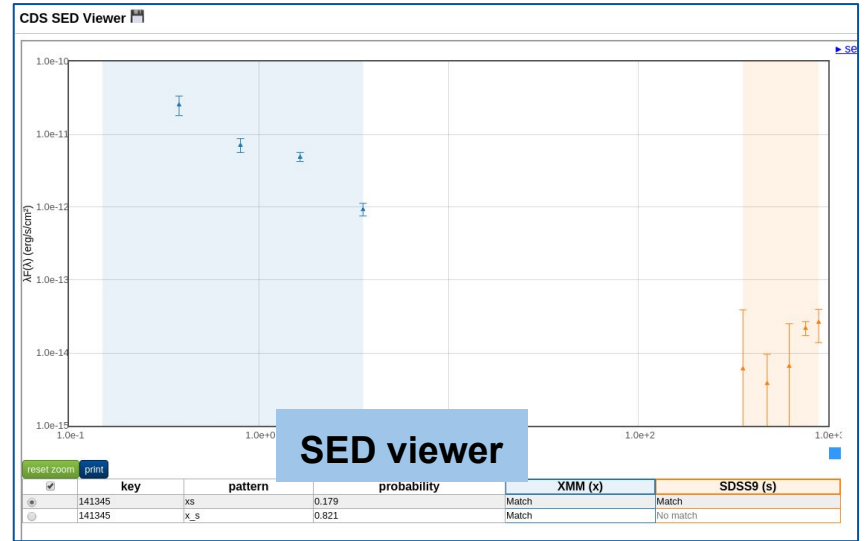
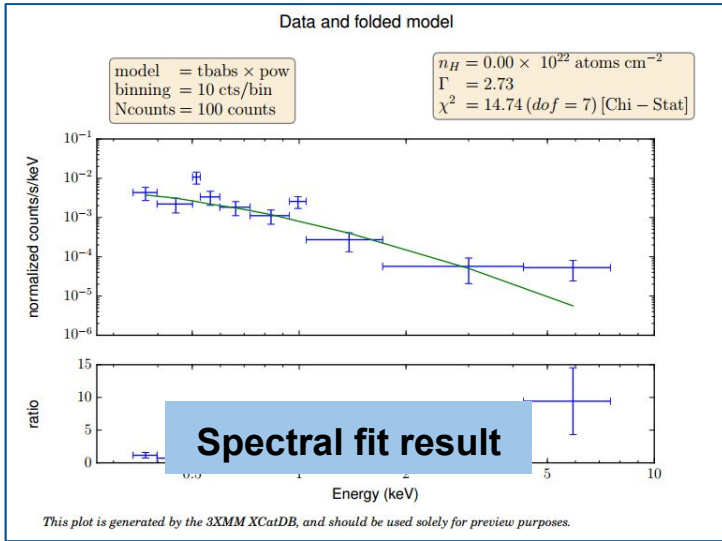
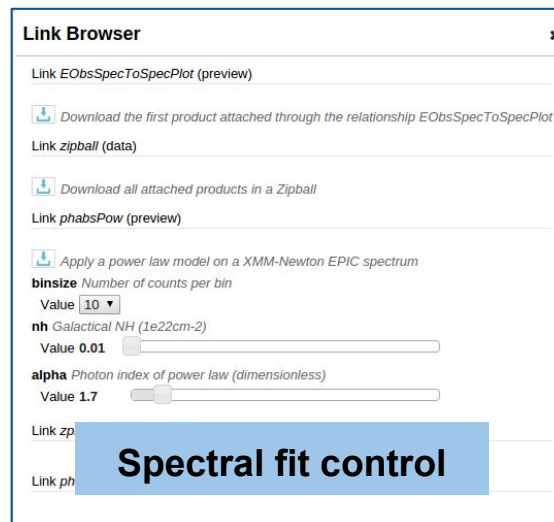
Display/Hide Query Text Reset Query Form

Select ENTRY From EnhancedEntry In Enhanced
Limit 1000

Widgets do not reflect the query anymore after you modified it directly

- Features grouped in Tabs
- Constraints edited one by one and stacked
- Editable query string

And Some Others

Link Browser

Link [EObsSpecToSpecPlot \(preview\)](#)

[Download the first product attached through the relationship EObsSpecToSpecPlot](#)

Link [zipball \(data\)](#)

[Download all attached products in a Zipball](#)

Link [phabsPow \(preview\)](#)

[Apply a power law model on a XMM-Newton EPIC spectrum](#)

binsize Number of counts per bin
 Value

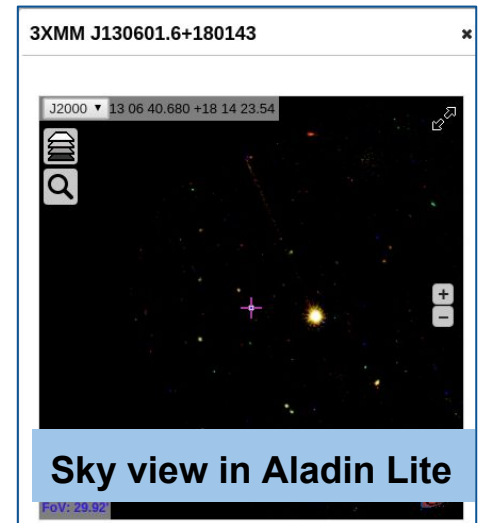
nh Galactic NH (1e22cm-2)
 Value

alpha Photon index of power law (dimensionless)
 Value

Link [zp](#)

Link [ph](#)

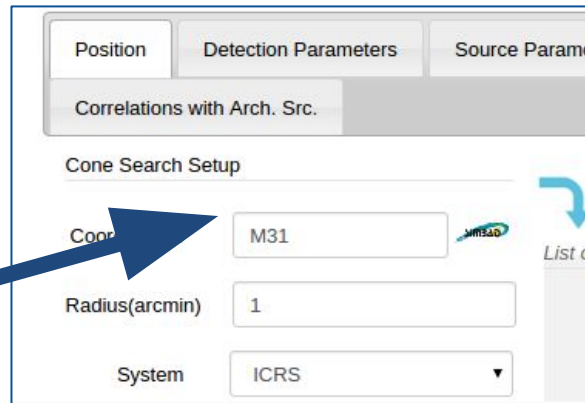
Spectral fit control



Querying by Positions

4 Modes

- By name
- By coordinates
- By list
- By region



Position Detection Parameters Source Parameters

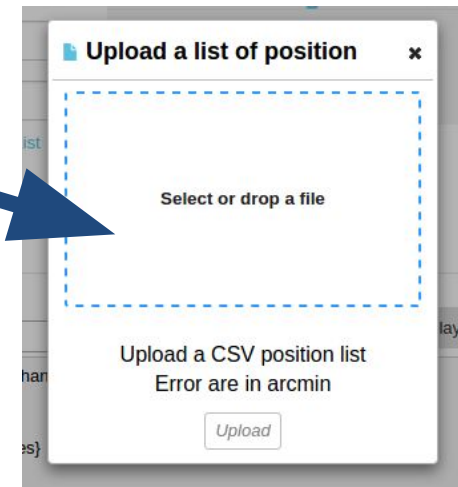
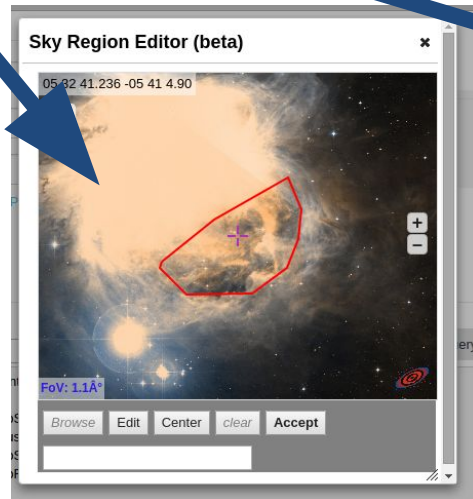
Correlations with Arch. Src.

Cone Search Setup

Coordinates: M31

Radius(arcmin): 1

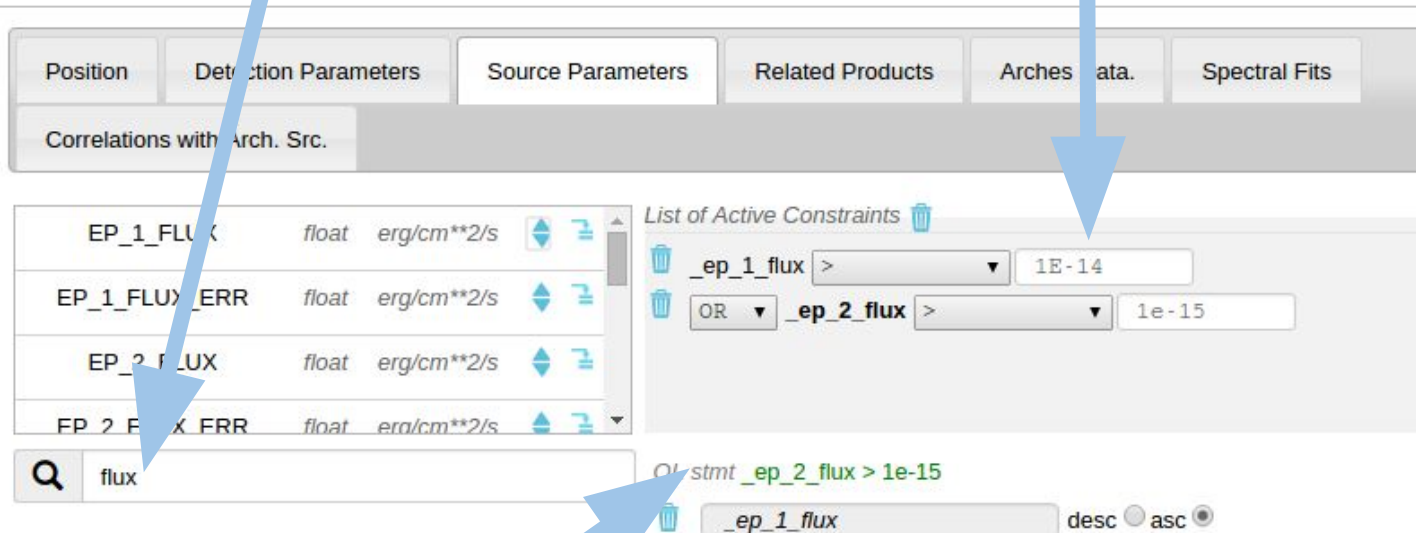
System: ICRS



Querying by Source Parameters

Search bar to find out the right keyword

Multiple constraints can be stacked



The screenshot shows the ARCHES query interface with the following components:

- Navigation Tabs:** Position, Detection Parameters, Source Parameters, Related Products, Arches Data, Spectral Fits.
- Correlations with Arch. Src.:** A section for exploring correlations.
- Parameter List:**

EP_1_FLUX	float	erg/cm**2/s		
EP_1_FLUX_ERR	float	erg/cm**2/s		
EP_2_FLUX	float	erg/cm**2/s		
EP_2_FLUX_ERR	float	erg/cm**2/s		
- Search Bar:** Contains the text "flux".
- List of Active Constraints:**
 - `_ep_1_flux >`
 - `OR` `_ep_2_flux >`
- Ordering:** `Order stmt _ep_2_flux > 1e-15` and `_ep_1_flux` with `desc` and `asc` radio buttons.

Syntax checking

Ordering parameter

Filtering the Fitting Models

Filter Detections by

Position Detection Parameters Source Parameters Related Products Arches Data. Spectral Fits

Correlations with Arch. Src.

Model(s) Fit Parameters

Models

- Spectral fit for the model **WAPO** is performed, goodness < 50%, acceptable fit
- No condition is specified for the model **WAPOH**
- No condition is specified for the model **WAPOS**
- Spectral fit for the model **WAMEKAL** is performed, goodness > 50%

*one click on the check button for acceptable fit,
two click on the check button for not acceptable fit,
three click on the check button for no specified condition.*

Select model fitting or not

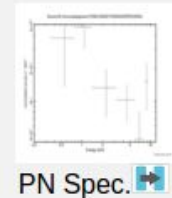
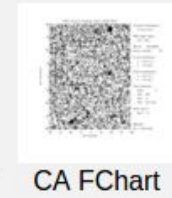
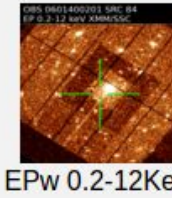
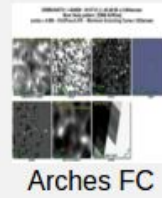
Fitting an EPIC Spectrum

Selection of Individual Detections

3XMM J005731.1-464858 (id=206014002010084)

00:57:31.18-46:48:58.4 ± 0.9200arcsecarcsec [More...](#)

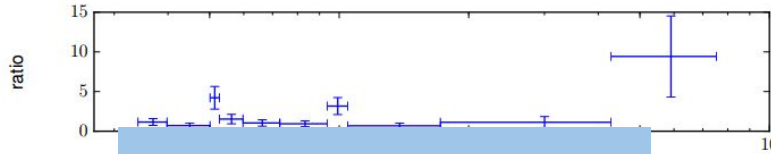
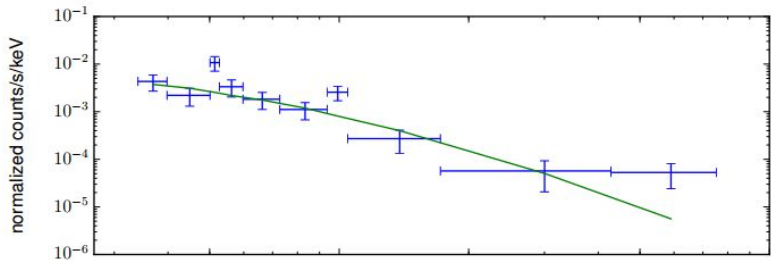
Observation 0601400201	9/12/2011 22:52:21
Source parameters may be affected (1)	Point Source Not variable
Det ML 38.4590 (0.2 12keV)	
6.76E-15 ± 1.64E-15 erg/sec/cm2 (0.2 12keV)	
129 ± 18 counts	
HR1 1.0000	HR2 0.5751
HR3 -0.1423	HR4 -0.5812



Data and folded model

model = tbabs × pow
binning = 10 cts/bin
Ncounts = 100 counts

$n_H = 0.00 \times 10^{22}$ atoms cm^{-2}
 $\Gamma = 2.73$
 $\chi^2 = 14.74$ (dof = 7) [Chi - Stat]



Fit plot

This plot is generated by the software.

Link Browser

Link EObsSpecToSpecPlot (preview)

Download the first product attached through the relationship EObsSpecToSpecPlot

Link zipball (data)

Download all attached products in a Zipball

Link phabsPow (preview)

Apply a power law model on a XMM-Newton EPIC spectrum

binsize Number of counts per bin

Value 10

nh Galactic NH (1e22cm-2)

Value 0.01

alpha Photon index of power law (dimensionless)

Value 1.7

Fitting parameter setup

Filter by ACDS Identifications

Correlations with Arch. Src.

By Vizier Keywords By Catalogue Names By Cross-Identifications

astronomy mission wavelength

- Abundances
- AGN
- Binaries:cataclysmic
- BL_Lac_objects
- Blue_objects
- Clusters_of_galaxies
- Galaxies
- Galaxies:Merger

- AKARI
- ASCA
- Chandra**
- Einstein
- EUVE
- FAUST
- Hipparcos
- IRAS

- EUV
- IR
- optical
- Radio
- UV
- X-ray

Select the matching catalogue with the Vizier keywords

Correlations with Arch. Src.

By Vizier Keywords By Catalogue Names By Cross-Identifications By UCDs

J/A+A/356/445/table1	ROSAT-FIRST AGN correlation (Brinkmann+, 2000)	List of Active Constraints J/A+A/356/445/table1 at < 5 arcsec
J/A+A/356/445/table2	ROSAT-FIRST AGN correlation (Brinkmann+, 2000)	

AGN

QL stmt J/A+A/356/445/table1 < 5
Constrain correlated sources by catalogue and distance

Search bar to find out the right catalogue

Multiple constraints can be stacked

Distance can also be constrained

This Session

- **The session propose a set of simple use cases using one database feature**
 - Proposed exercises are each dedicated to one tab of the query editor
- **These individual features can be combined to build complex queries matching our own science cases**
- **Any suggestion for improving this interface is welcome**
 - Bug
 - Feature
 - Layout