Introduction to SphinX data format and analysis

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SOTERIA Capacity Building Workshop
http://soteria-space.eu/wiki/index.php/Capacity_Building_Workshop
Royal Observatory of Belgium
Ringlaan 3, 1180 Brussels
February 15, 2011

SphinX data format and analysis

***the present status of SphinX database, instrument paper, calibration paper etc.**

***which data blocks are already pre-prepared for the analysis –with Magdalena & Piotr involvement,**

***what is the present "distribution" of tasks in the data analysis between groups and individuals including**

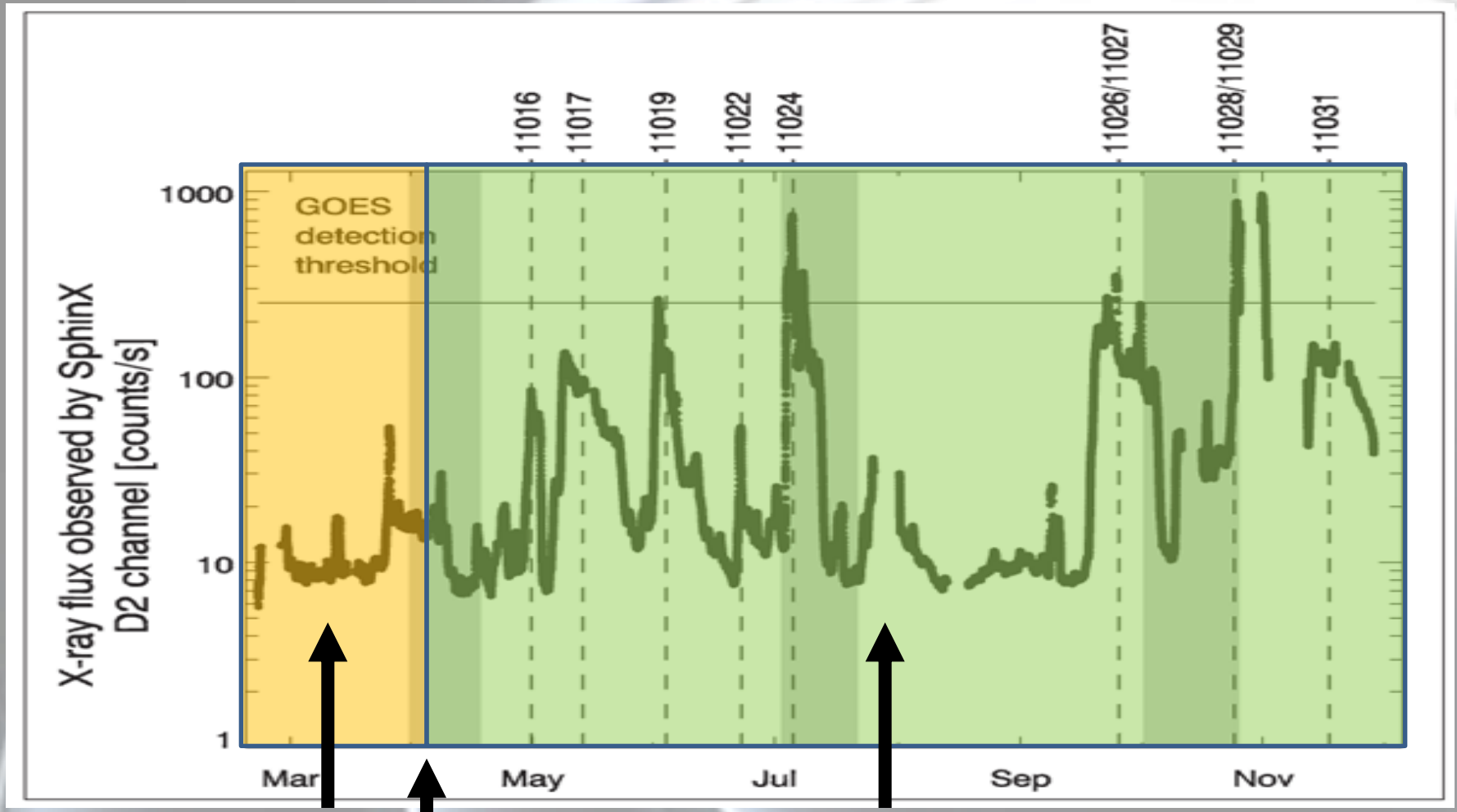
Harvard group

Palermo group

SOTERIA

Wrocław group

SphinX mission phases



Phase 1

Phase 2

April 6, 2009 optimum on-board operation and data collection strategy achieved

SphinX data – summary

February 20, 2009 – November 29, 2009

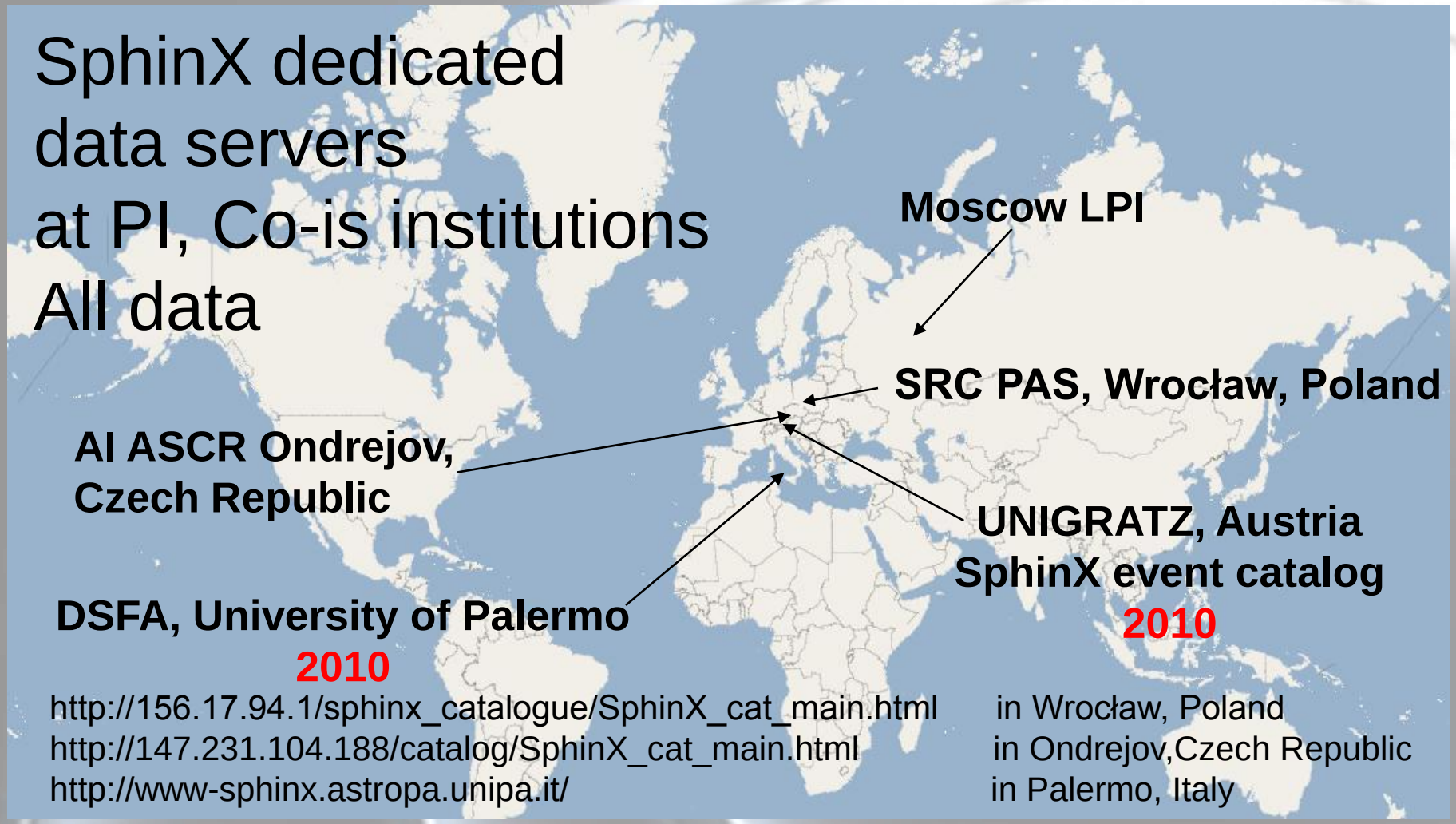
Low solar activity

Data from D1 and D2 detectors only

~5×10^9 EVENTS registered

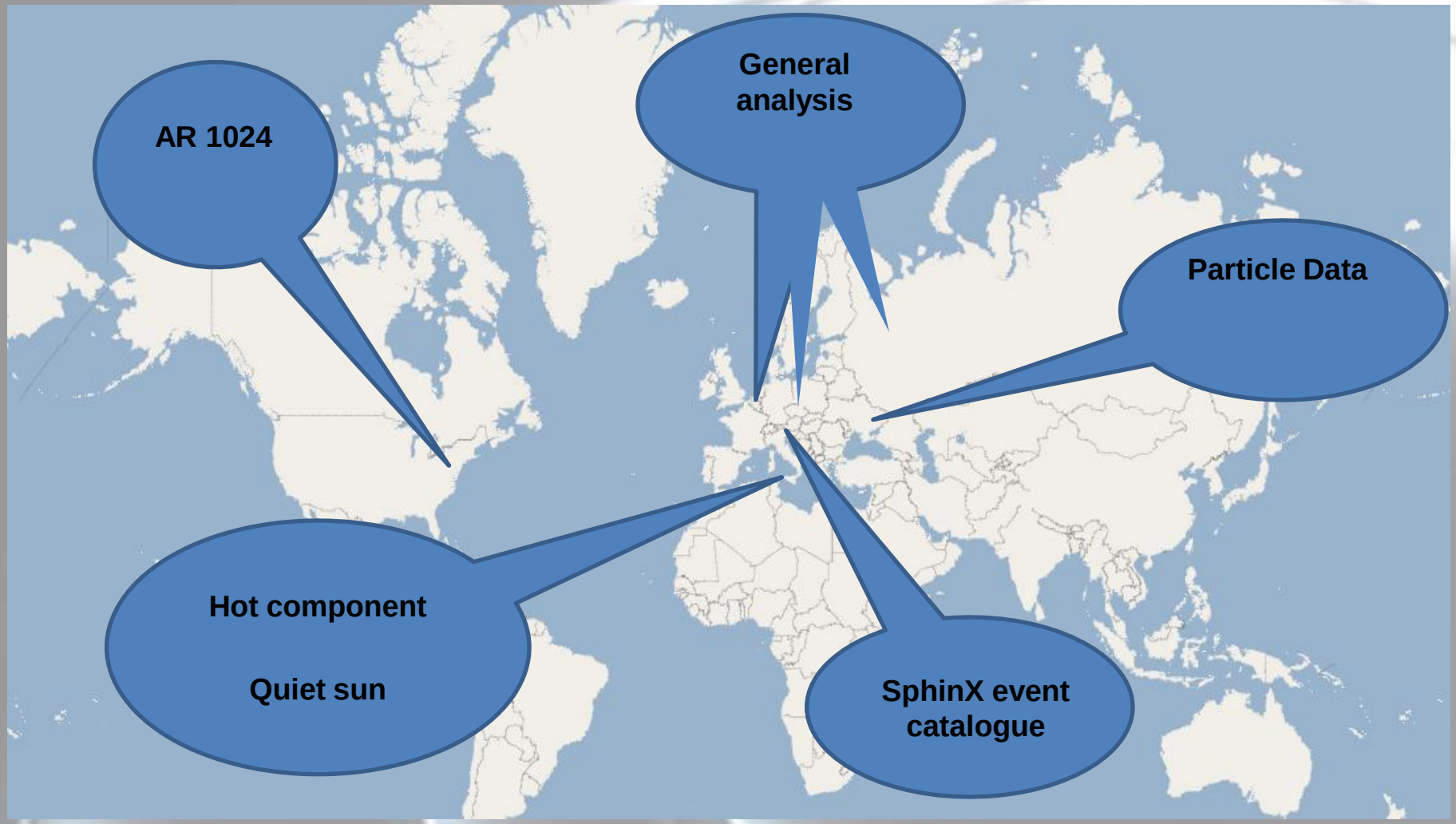
EVENT = (Tphot, Ephot)

Dissemination of SphinX data



VSO, SODA Level 1 data (FITS)

SphinX data user needs …



Reasonable compromise – event lists + filtering by flags
P. Podgorski talk

SphinX event FITS Format

OGIP 93/003 or higher

http://heasarc.gsfc.nasa.gov/docs/heasarc/ofwg/docs/general/ogip_93_012/

http://heasarc.gsfc.nasa.gov/docs/heasarc/ofwg/docs/rates/ogip_93_003/ogip_93_003.html#tth_sEc4.8

SphinX events FITS content

PRIMARY HEADER

EVENT HEADER
EVENT BINARY TABLE

EXPOSURE HEADER
EXPOSURE BINARY TABLE

GTI HEADER
GTI BINARY TABLE

SphinX data catalogue

All SphinX data available here are Level_1 data.

2009																													
January	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
February	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
March	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
April	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
May	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
June	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
July	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
October	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
November	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Last update: Fri Jan 14 20:23:36 2011 (UTC+1)

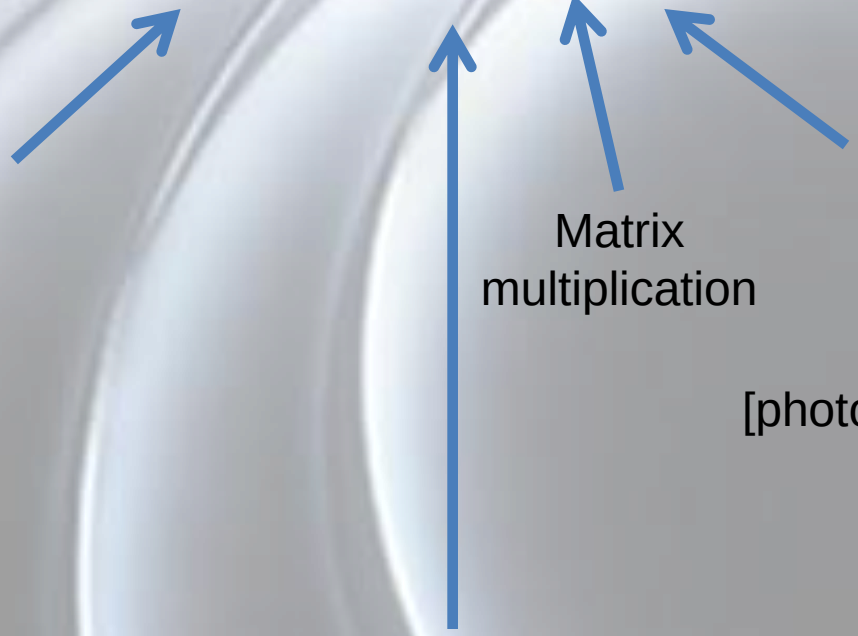
contact:
Szymon Gburek - Any questions concerning content of data from SphinX catalogue.
Piotr Podgorski - Report any technical problems with SphinX data catalogue.

http://156.17.94.1/sphinx_l1_catalogue/SphinX_cat_main.html

Obsolete from 23 March 2011

SphinX DRM for spectral analysis

OUT = DRM#(IN*DE)



SphinX observed Spectrum

[counts/s]

Matrix multiplication

Input real spectrum Model

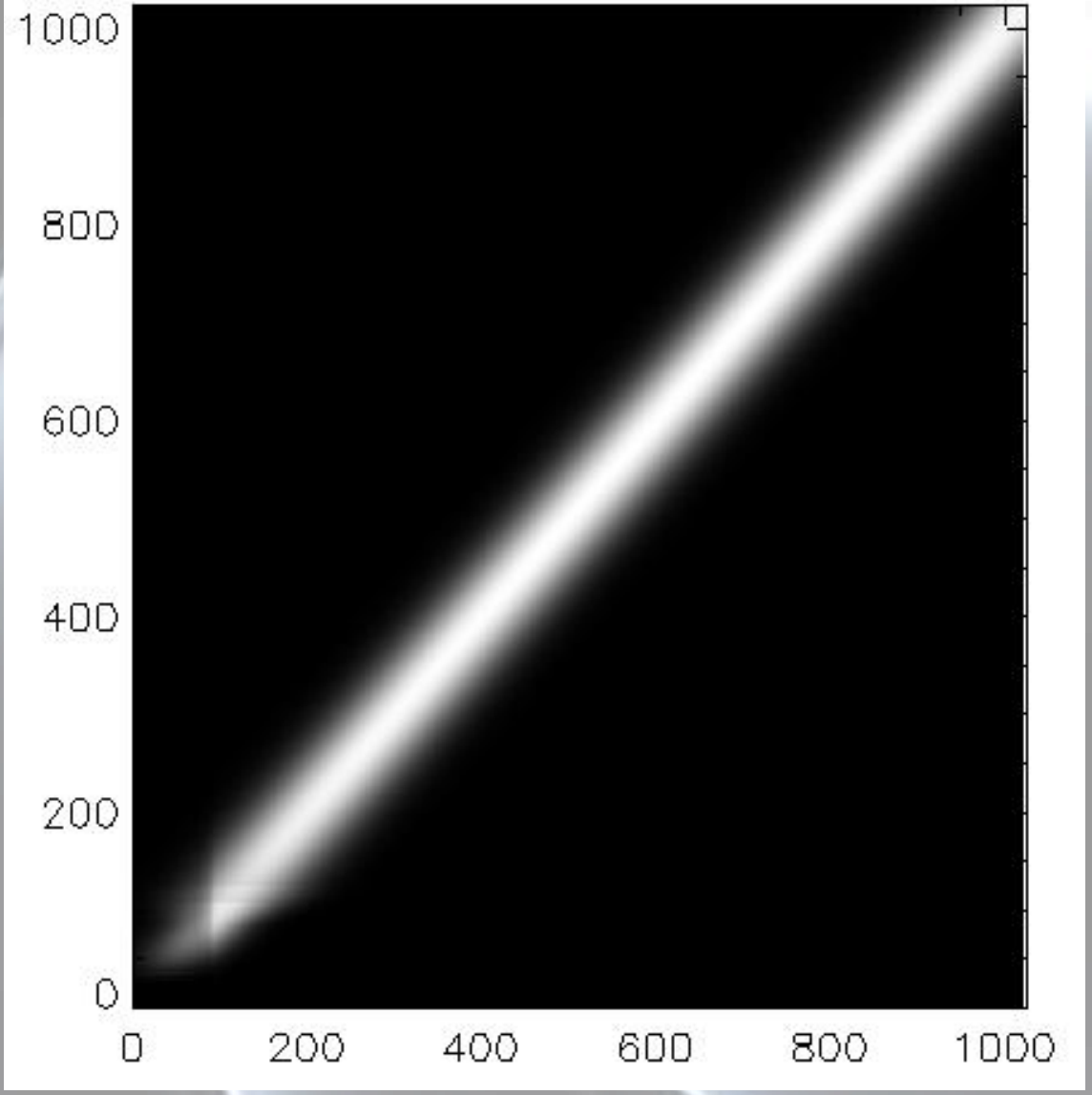
[photons/s/cm2/keV]

Detector Response Matrix

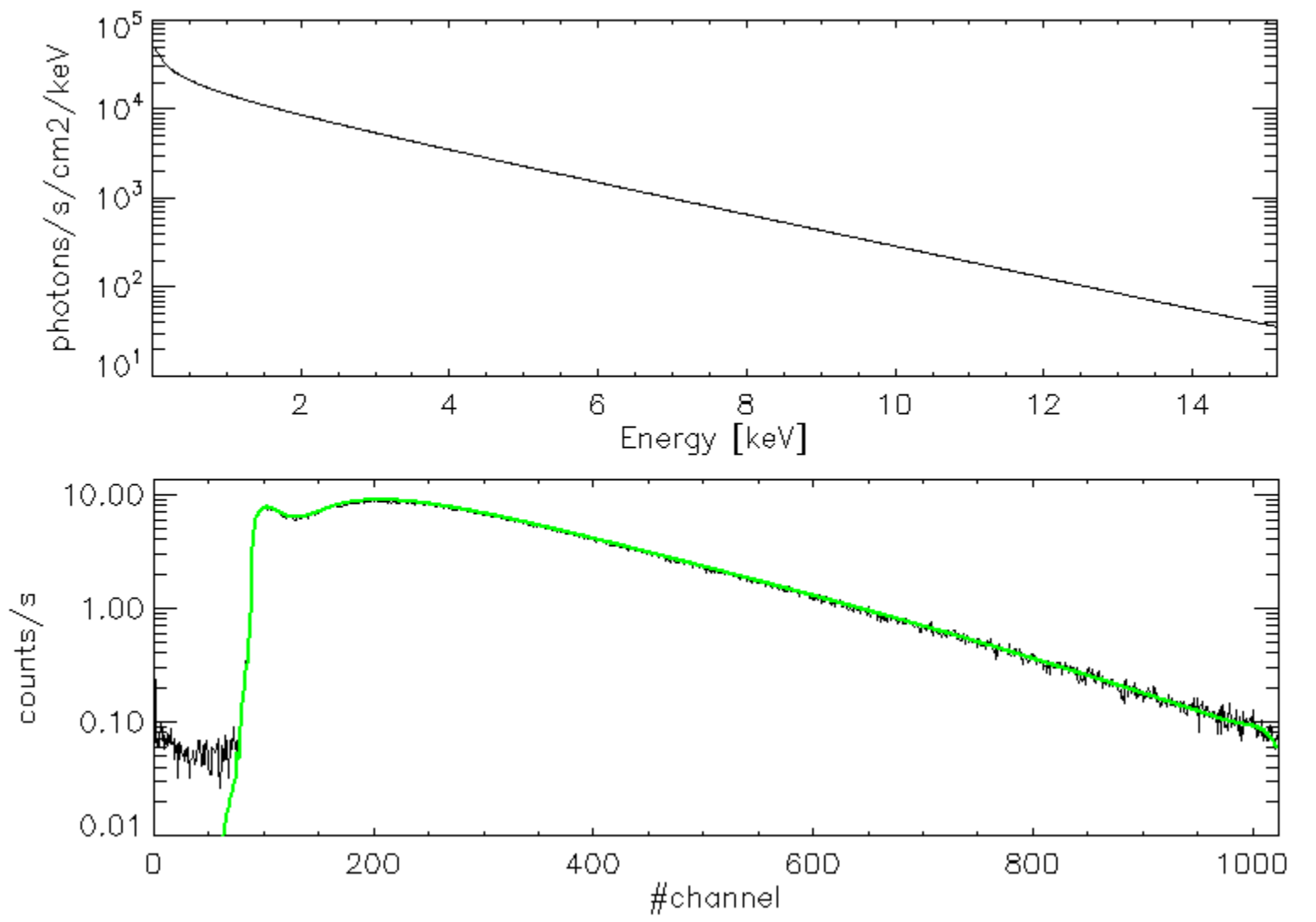
DE – IN spectrum energy bins

DRM is known from calibration – Palermo/Bessy

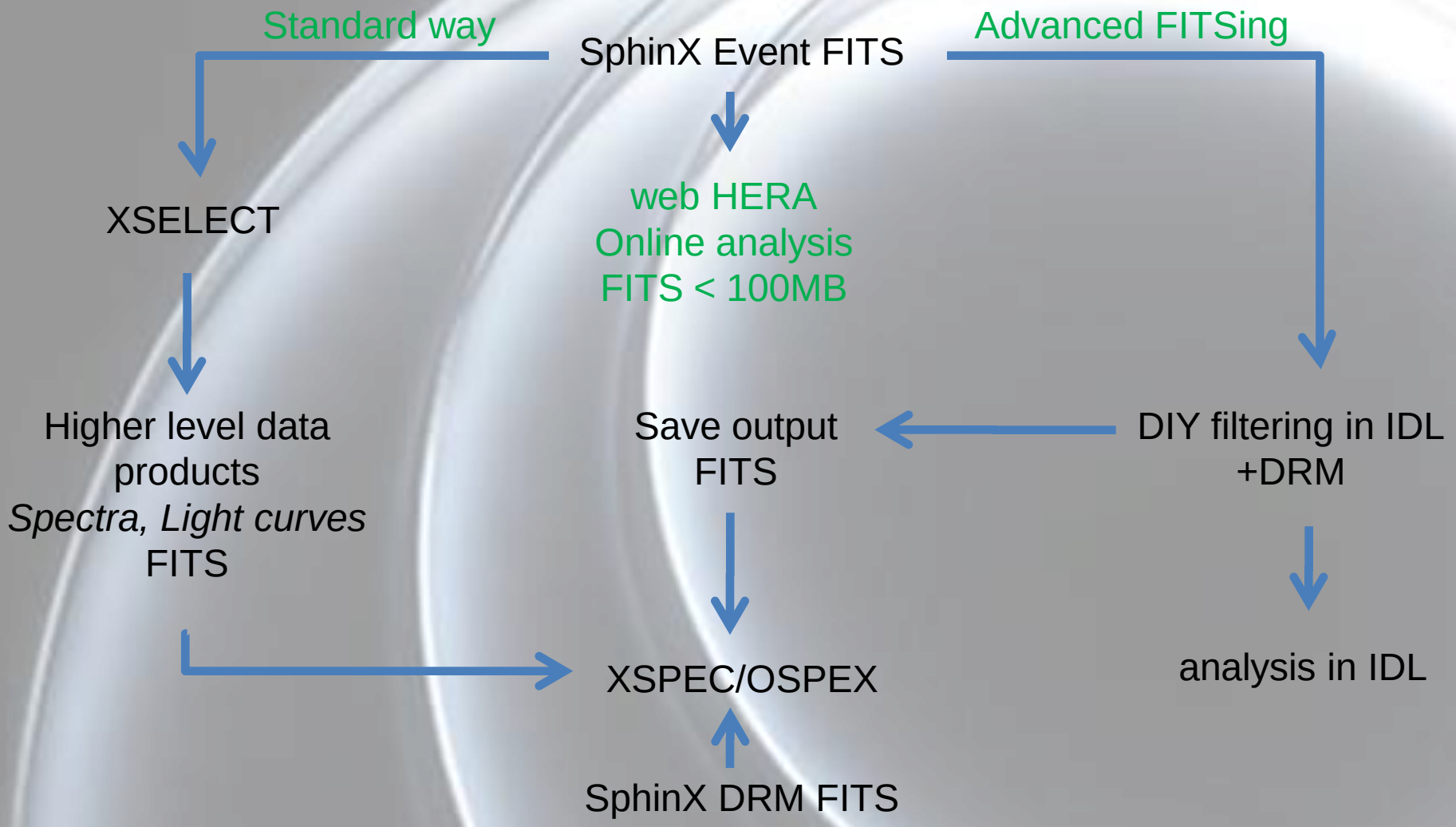
SphinX DRM



SphinX DRM

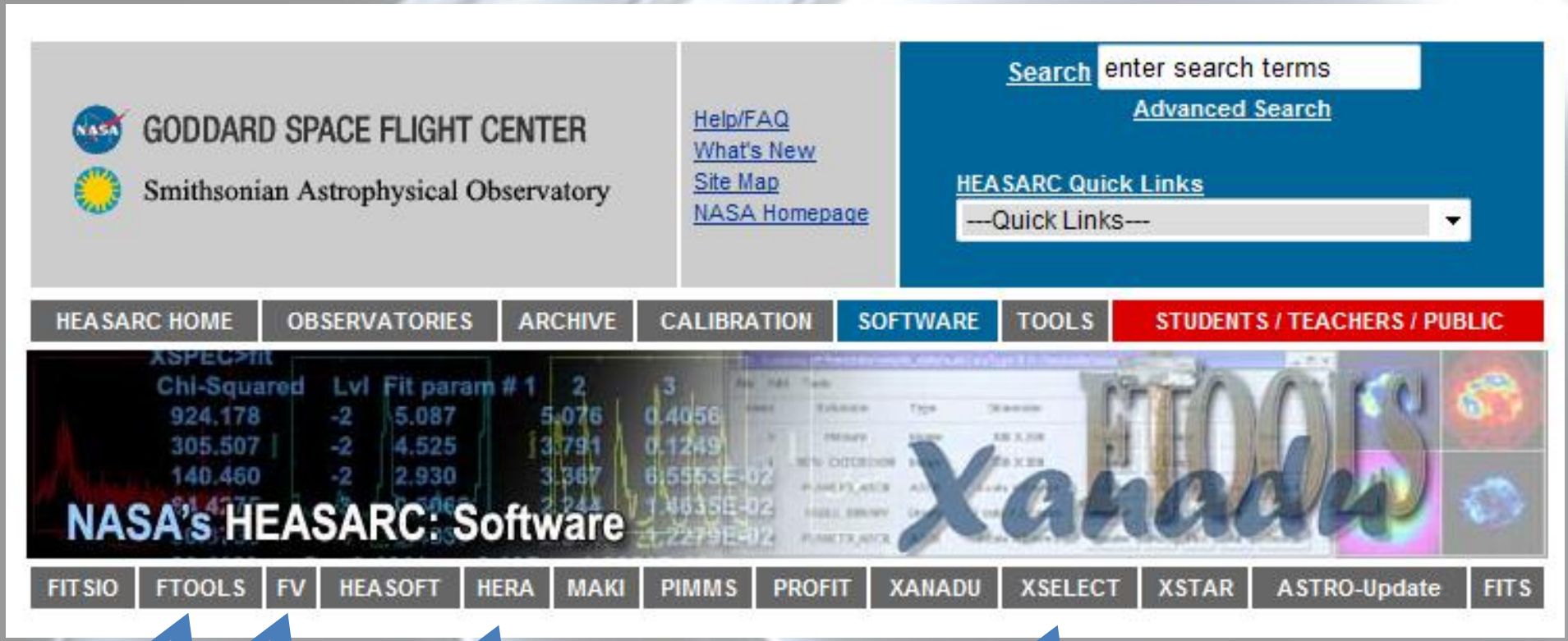

photons/s/cm2/keV
10^5
10^4
10^3
10^2
10^1
2
4
6
8
10
12
14
Energy [keV]
counts/s
10.00
1.00
0.10
0.01
0
200
400
600
800
1000
#channel

SphinX data analysis strategies mission phase 2

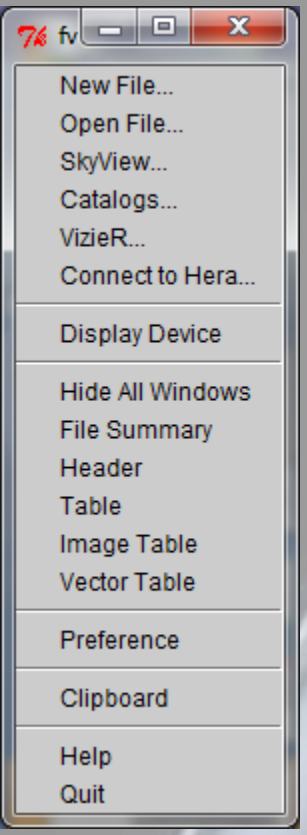


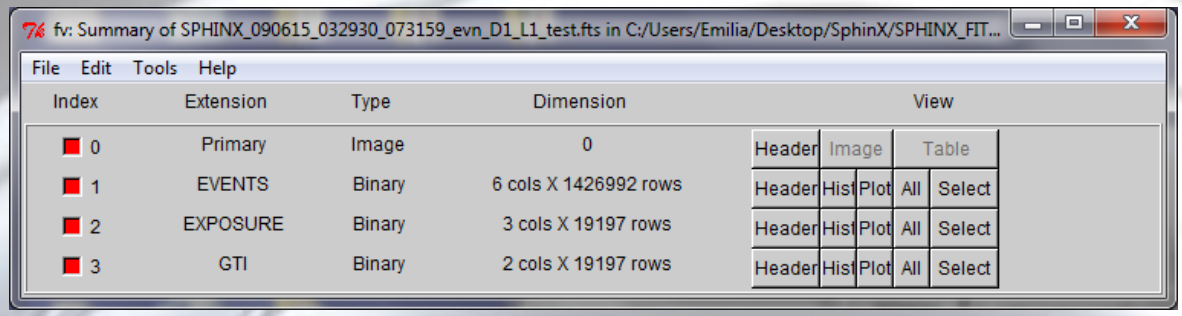
FITS tools and more

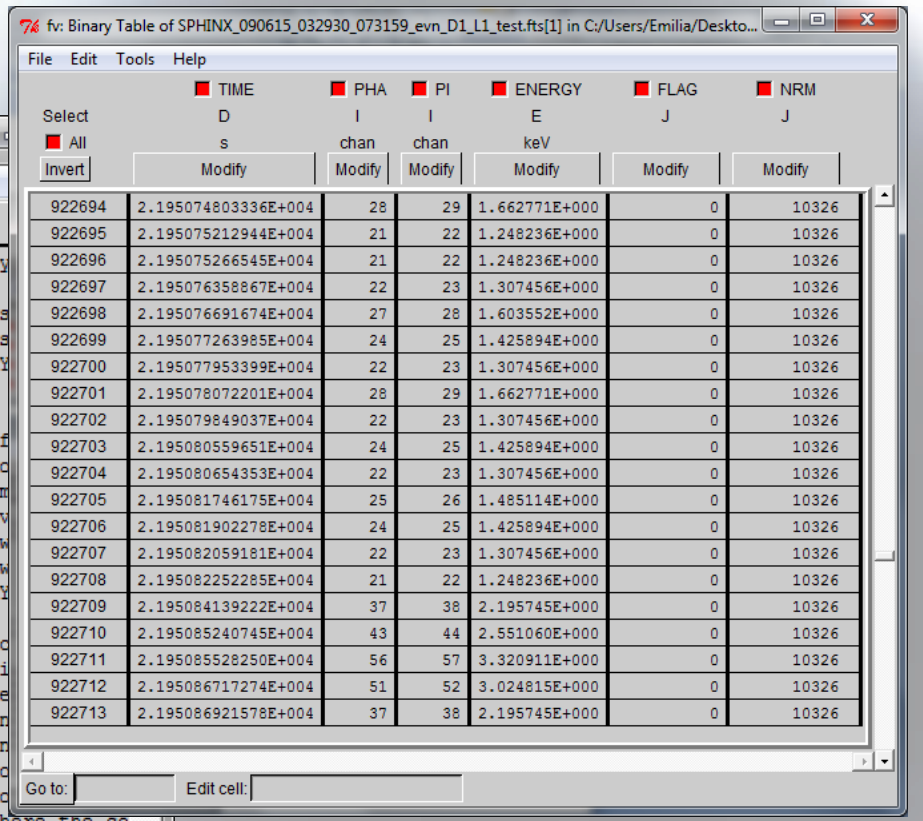
http://heasarc.gsfc.nasa.gov/docs/software.html

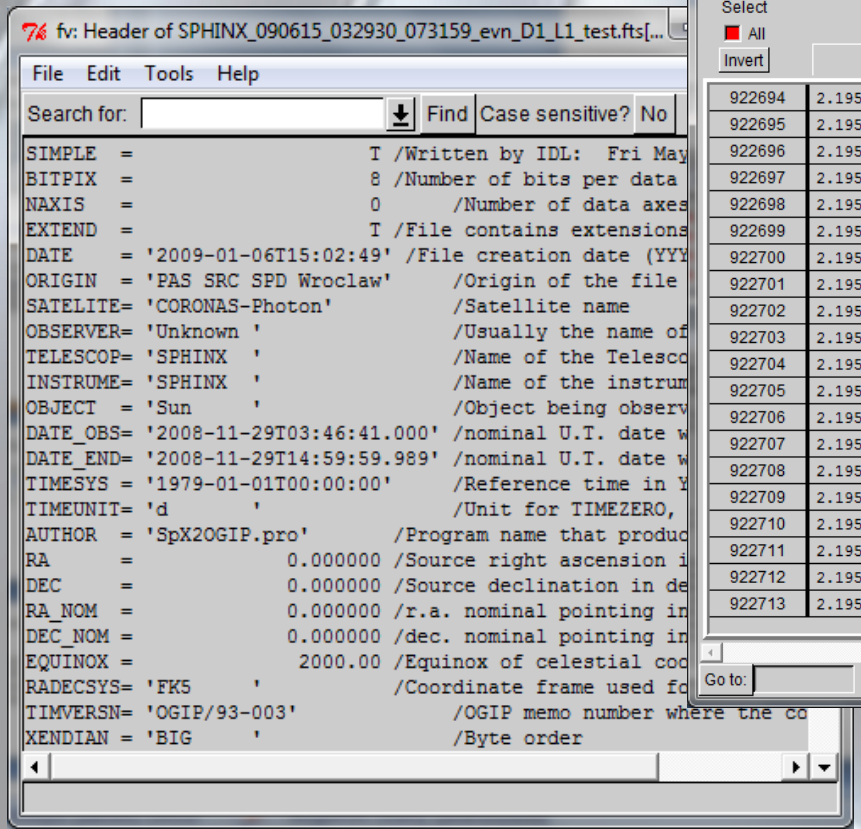


FITS #1Tool – fv visualisation of FITS content









Try on CBW3

SphinX FITS reading in IDL

data = mrdfits(filename, i, hdr, status=status)

IDL structure

Header – string array with description of data

i=0 - primary header, data =0
i=1 – events HDU
i=2 – exposure HDU
i=3 – GTI HDU

IDL> pm, hdr
IDL> help, data, /st

Useful links

HERA

http://heasarc.gsfc.nasa.gov/webHera/index.html

FTOOLS/XANADU

http://heasarc.gsfc.nasa.gov/docs/software.html

FITS I/O IDL routines

http://idlastro.gsfc.nasa.gov/fitsio.html

FITS I/O IDL routines in SolarSoft

http:/www.lmsal.com/solarsoft/

IDL SphinX specific software (TBD)

http://156.17.94.1/sphinx_l1_catalogue/SphinX_cat_main.html

Try on CBW3