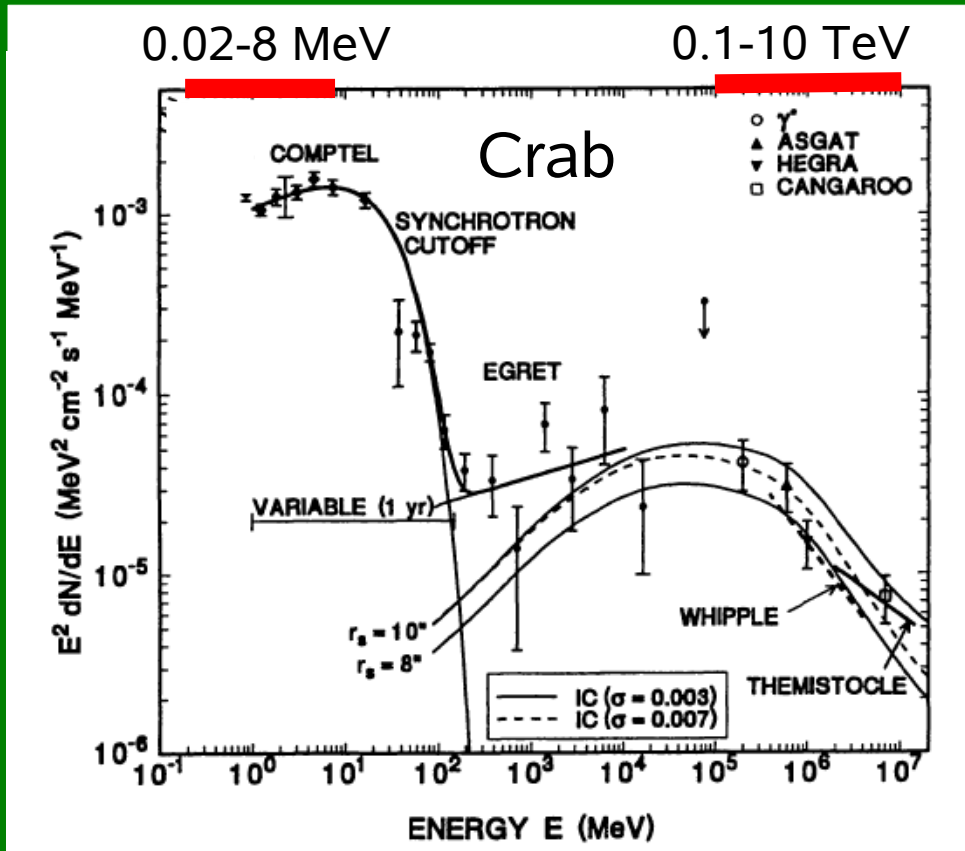
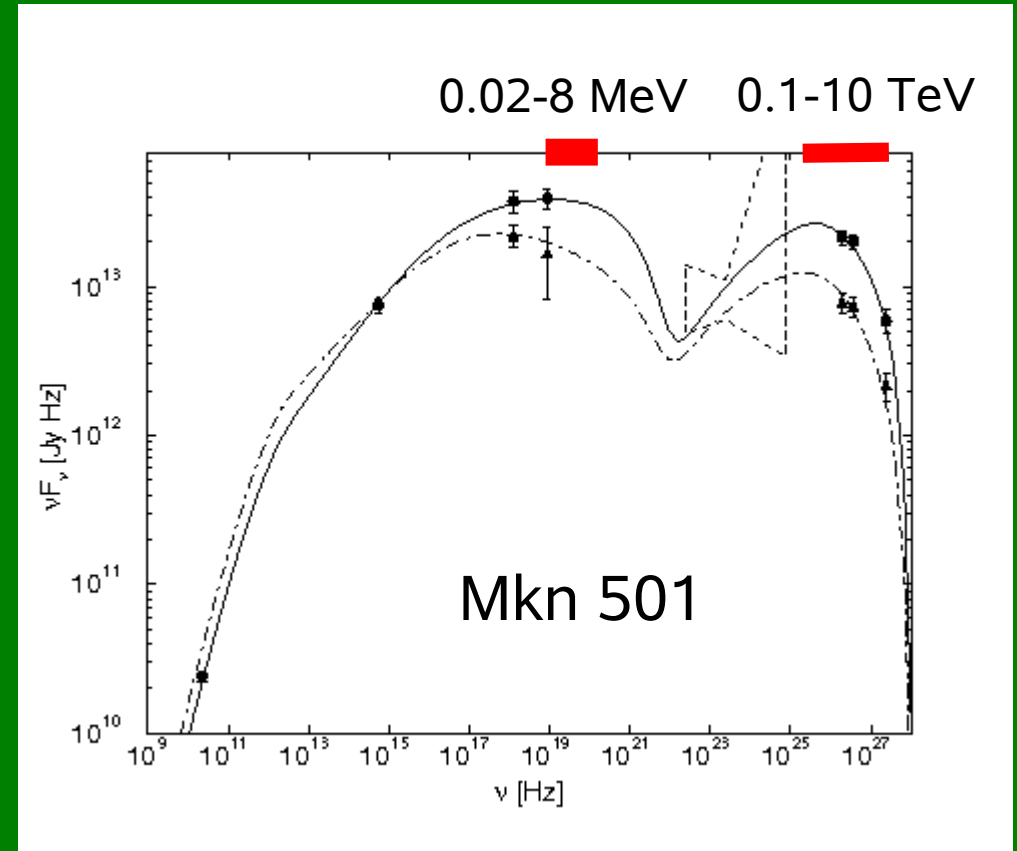


# TeV gamma-ray sources as seen by SPI

Dirk Petry (MPE)

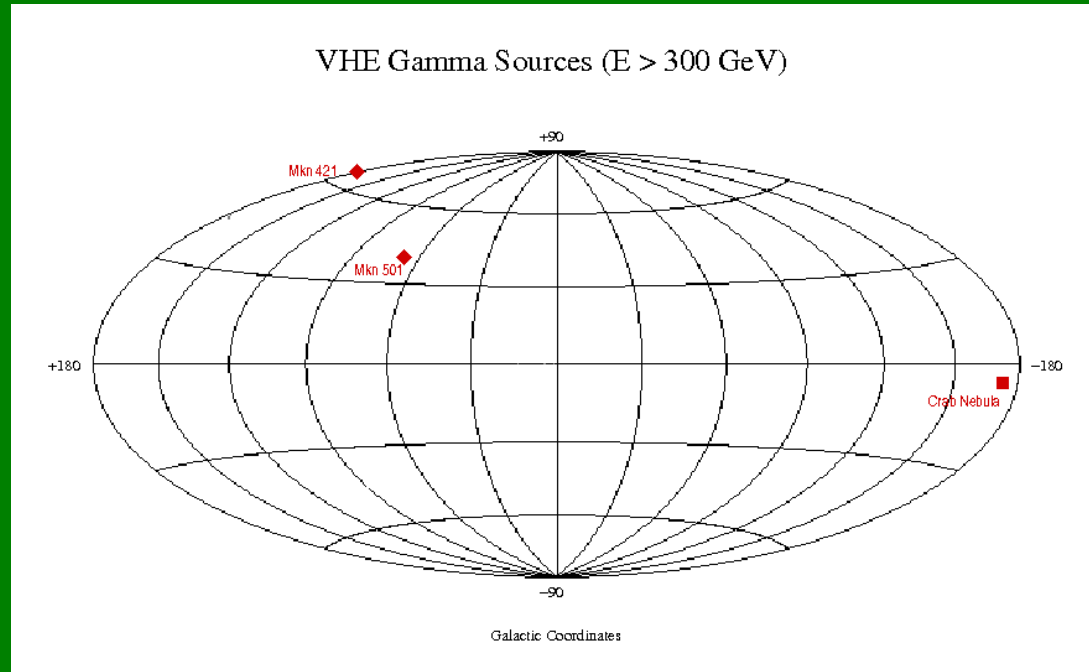


de Jager et al. 1996

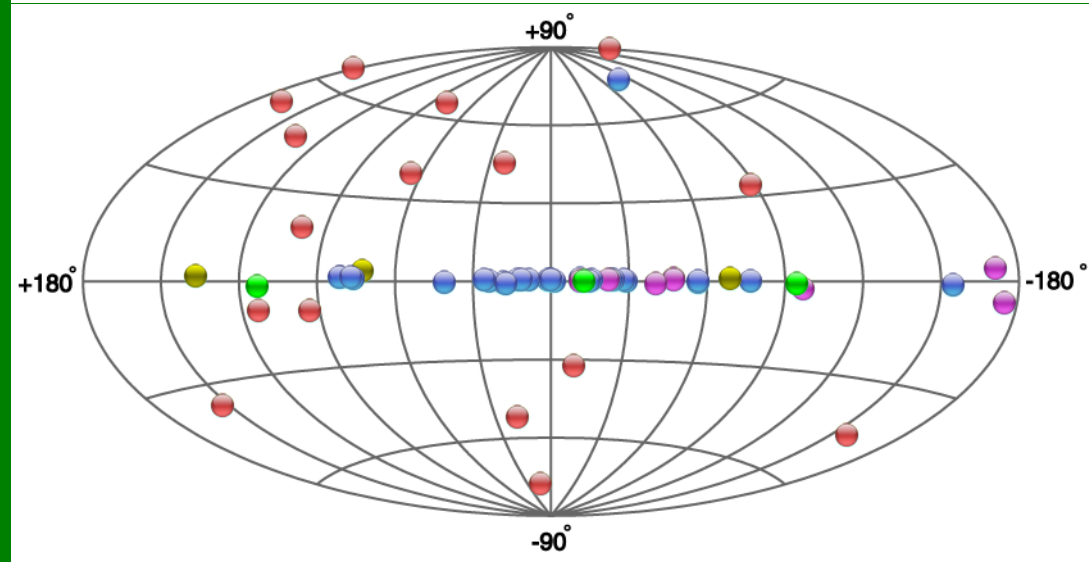


Petry et al. 2000

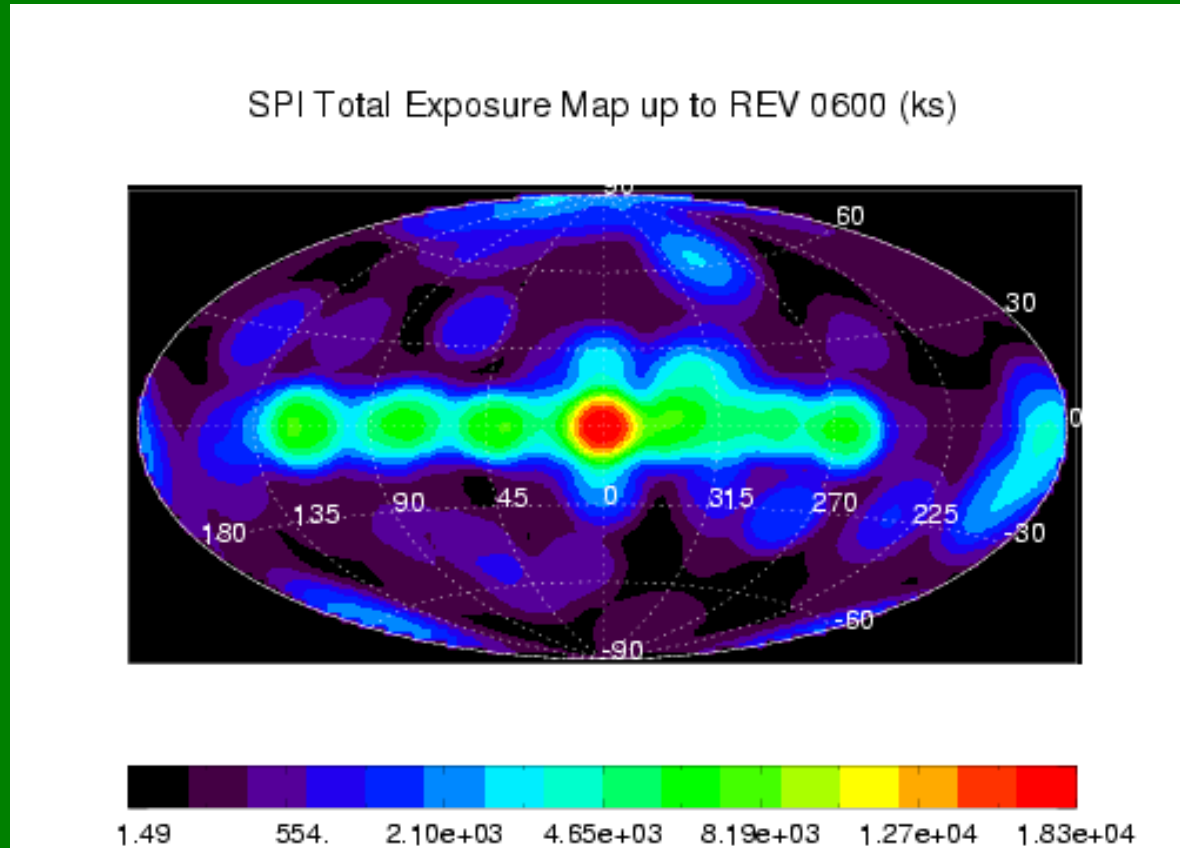
1997:  
3 objects



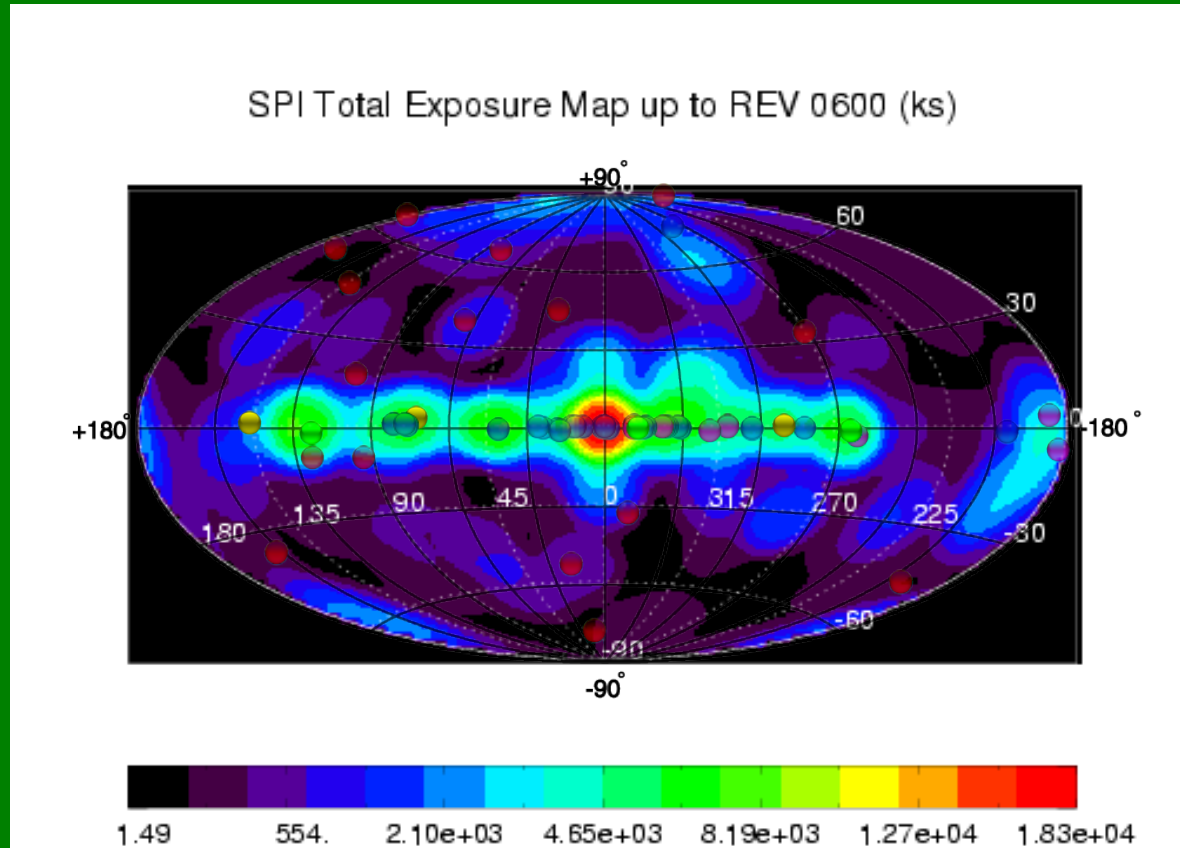
2007:  
> 50 objects



# Present accumulated INTEGRAL SPI exposure



# Present accumulated INTEGRAL SPI exposure

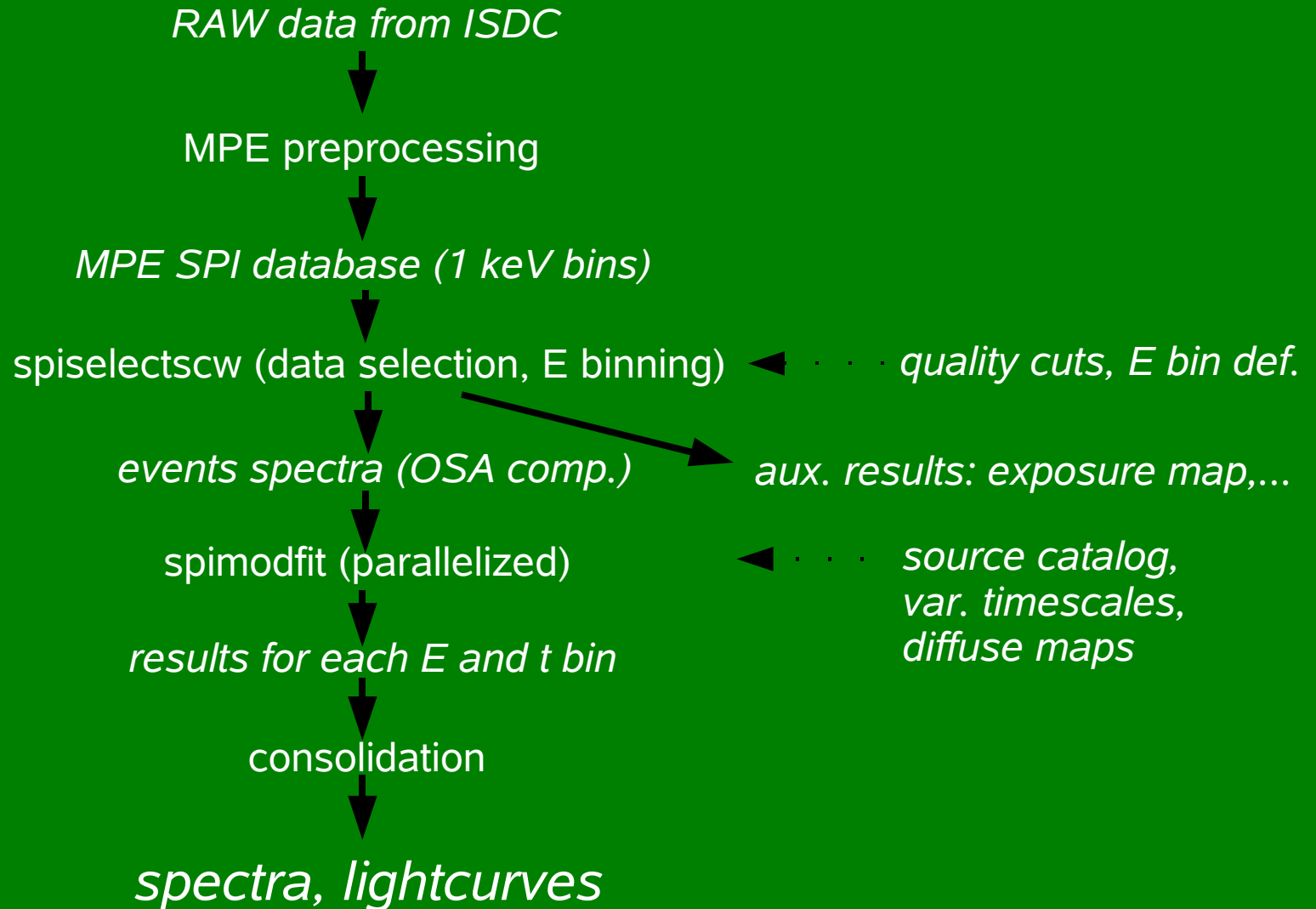


- well suited for the study of galactic VHE sources
- no so for AGN

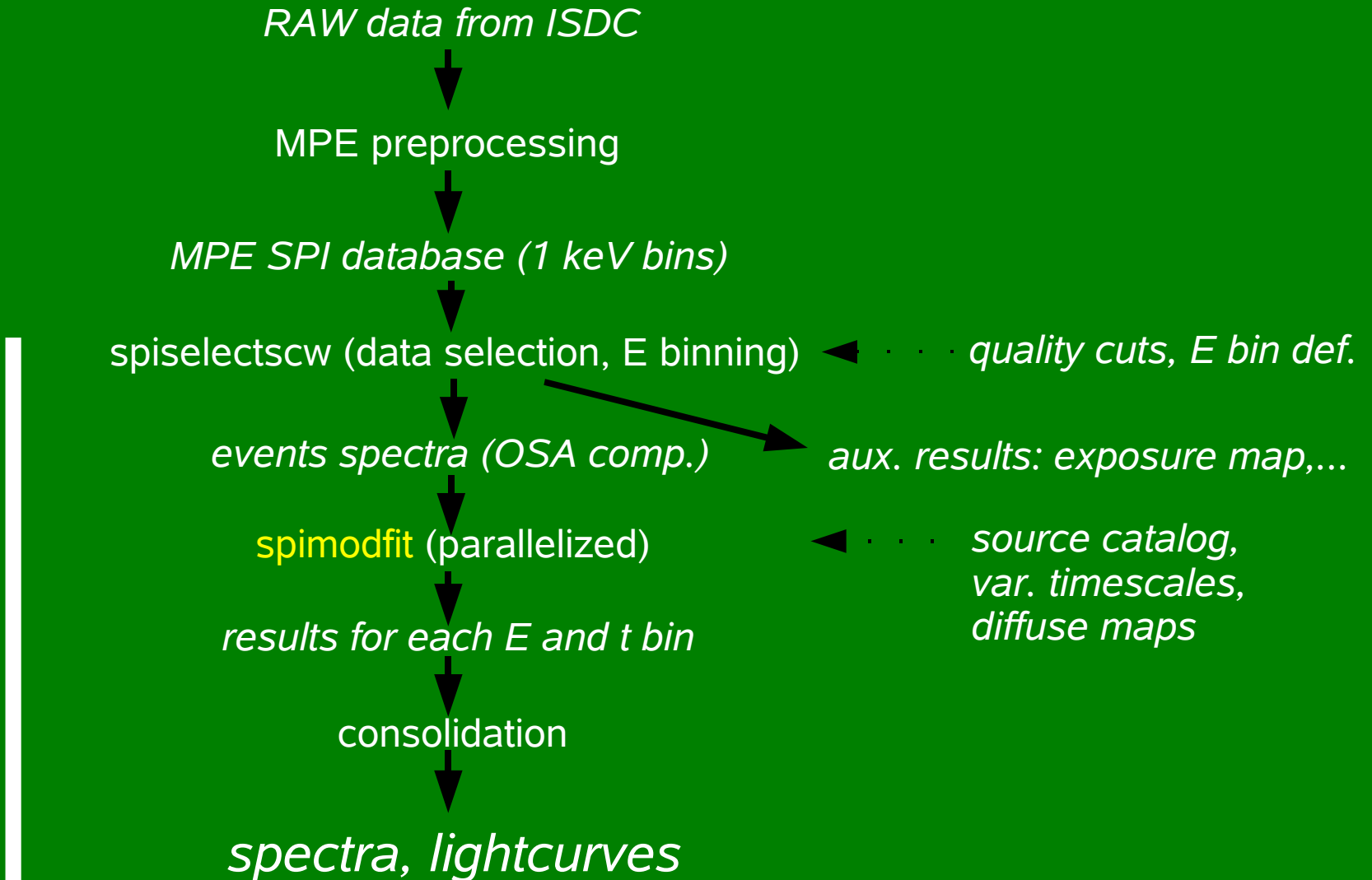
## The currently unidentified VHE sources

<a href="#">HESS J1634-472</a>	16 34 57.2	-47 16 02	UNID	H.E.S.S.	2006-01-01
<a href="#">HESS J1813-178</a>	18 13 36.6	-17 50 35	UNID	H.E.S.S.	2005-03-01
<a href="#">MGRO J1908+06</a>	19 08 00	+06 00 00	UNID	Milagro	2007-08-01
<a href="#">MGRO J2031+41</a>	20 31 00	+41 00 00	UNID	Milagro	2007-08-01
<a href="#">HESS J1825-137</a>	18 26 03.0	-13 45 44	UNID	H.E.S.S.	2005-03-01
<a href="#">HESS J1834-087</a>	18 34 46.5	-08 45 52	UNID	H.E.S.S.	2005-03-01
<a href="#">HESS J1809-193</a>	18 10 31	-19 18 00	UNID	H.E.S.S.	2007-09-01
<a href="#">HESS J1837-069</a>	18 37 37.4	-06 56 42	UNID	H.E.S.S.	2005-03-01
<a href="#">HESS J1614-518</a>	16 14 19.0	-51 49 07	UNID	H.E.S.S.	2005-03-01
<a href="#">HESS J1702-420</a>	17 02 44.6	-42 04 22	UNID	H.E.S.S.	2006-01-01
<a href="#">HESS J1708-410</a>	17 08 14.3	-41 04 57	UNID	H.E.S.S.	2006-01-01
<a href="#">GalCentreRidge</a>	17 45 41.3	-29 00 22	UNID	H.E.S.S.	2006-02-01
<a href="#">Galactic Centre</a>	17 45 41.3	-29 00 22	UNID	CANGAROO	2004-05-01
<a href="#">HESS J1616-508</a>	16 16 23.6	-50 53 57	UNID	H.E.S.S.	2005-03-01
<a href="#">TeV 2032+41</a>	20 32 07	+41 30 30	UNID	HEGRA	2002-10-01
<a href="#">MilagroDiffuse</a>	20 20 00	+38 00 00	UNID	Milagro	2005-12-01
<a href="#">HESS J1713-381</a>	17 13 58.0	-38 12 00	UNID	H.E.S.S.	2006-01-01
<a href="#">HESS J1745-303</a>	17 45 02.2	-30 22 14	UNID	H.E.S.S.	2006-01-01
<a href="#">HESS J1303-631</a>	13 03 00.4	-63 11 55	UNID	H.E.S.S.	2005-09-01
<a href="#">HESS J1632-478</a>	16 32 08.6	-47 49 24	UNID	H.E.S.S.	2006-01-01
<a href="#">HESS J1747-281</a>	17 47 23.2	-28 09 06	UNID	H.E.S.S.	2005-03-01
<a href="#">HESS J0632+058</a>	06 32 58	05 48 20	UNID	H.E.S.S.	2007-07-01
<a href="#">HESS J1804-216</a>	18 04 31.6	-21 42 03	UNID	H.E.S.S.	2005-03-01
<a href="#">MGRO J2019+37</a>	20 19 00	37 00 00	UNID	Milagro	2007-03-01

point source  
analysis  
pipeline

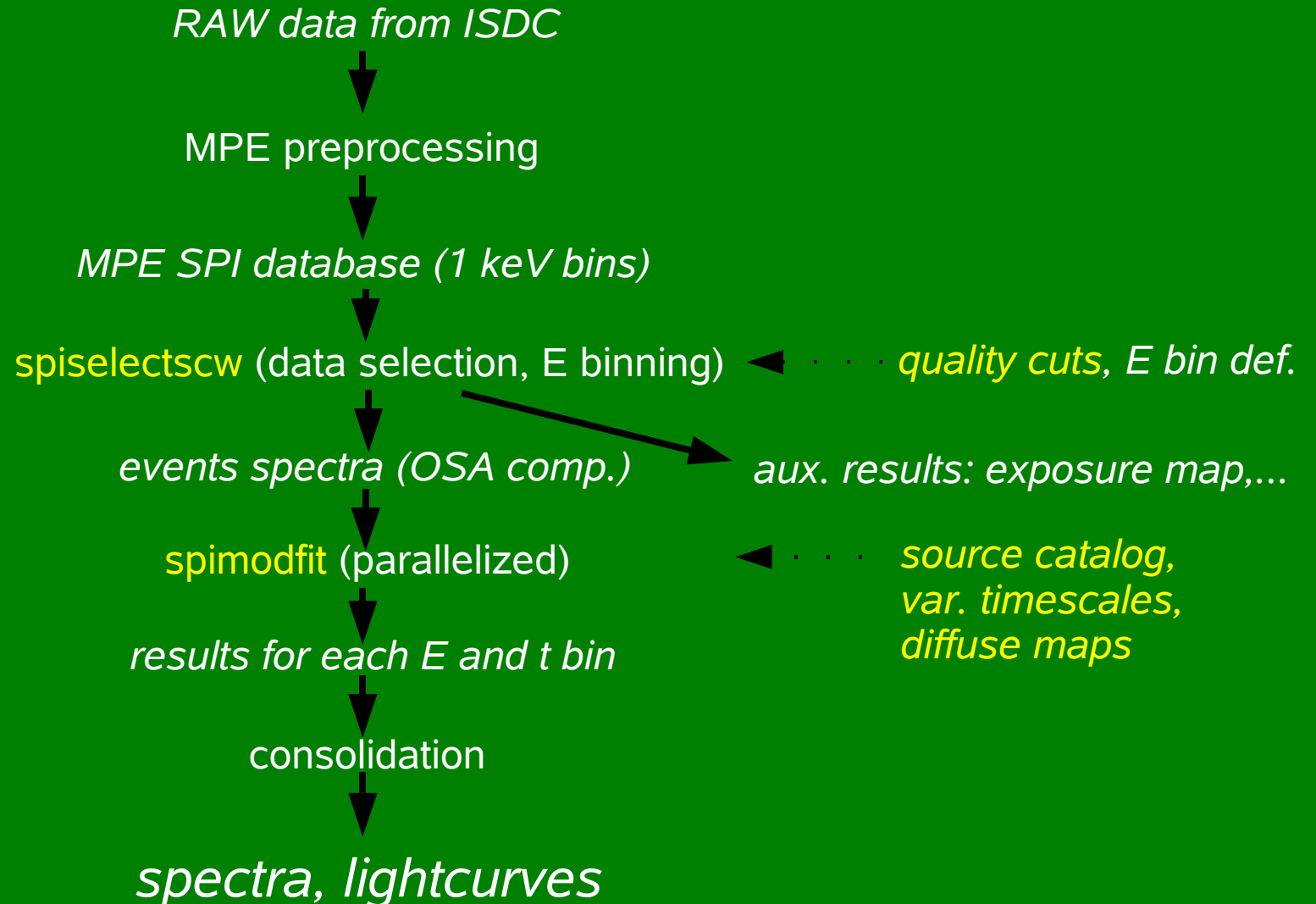


point source  
analysis  
pipeline





point source  
analysis  
pipeline



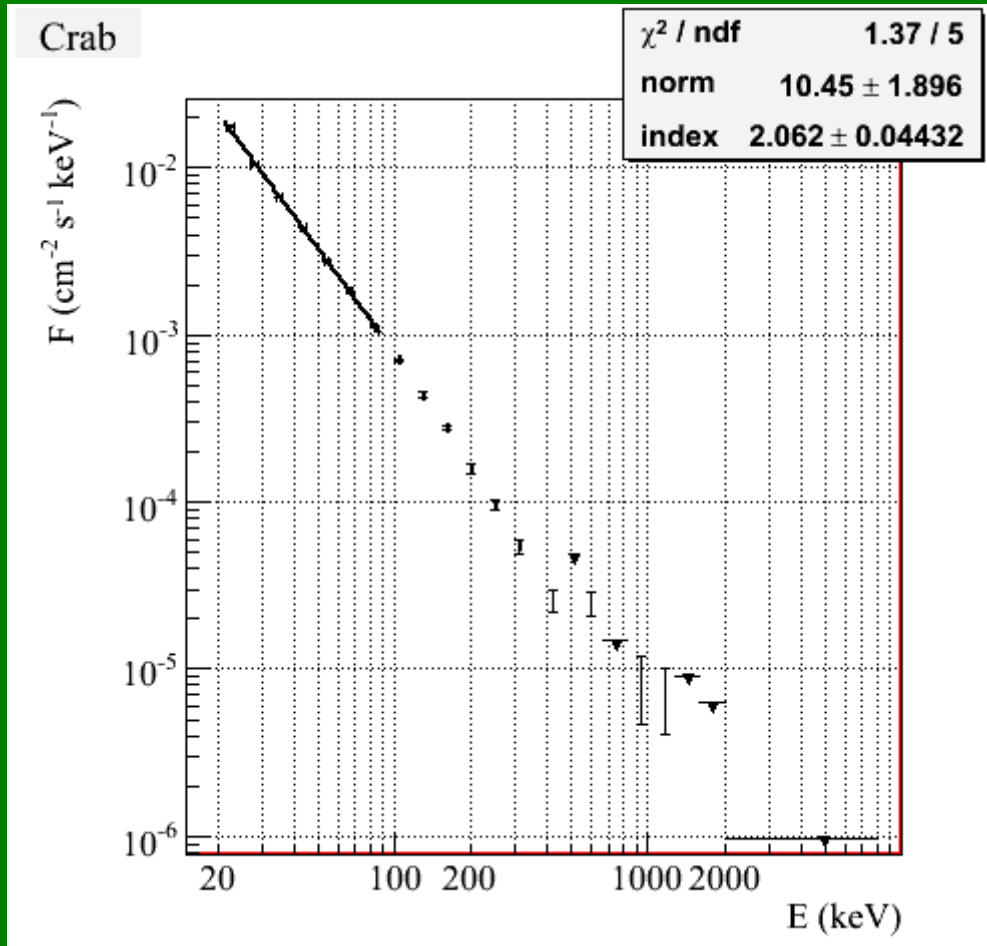
## Processing details

- Uses spiselectscw v3.9 and spimodfit v3.0 (both written by A. Strong and H. Halloin).
- Data selection on orbital phase, science window type, housekeeping parameters:
  - TempColdPlateMean (eliminate annealing periods)
  - SgleEvsTotRate
  - GOES 10 MeV proton rate
  - ACS rate
- Spimodfit fit includes 3 diffuse allsky-maps and an isotropic background component. The isotropic (instrumental) background component is set time variable on timescale of 4 science windows.
- Use "detector ratios" fitting (constant for the dataset = 1 revolution) , for longer datasets the variability of the ratios is still under study.

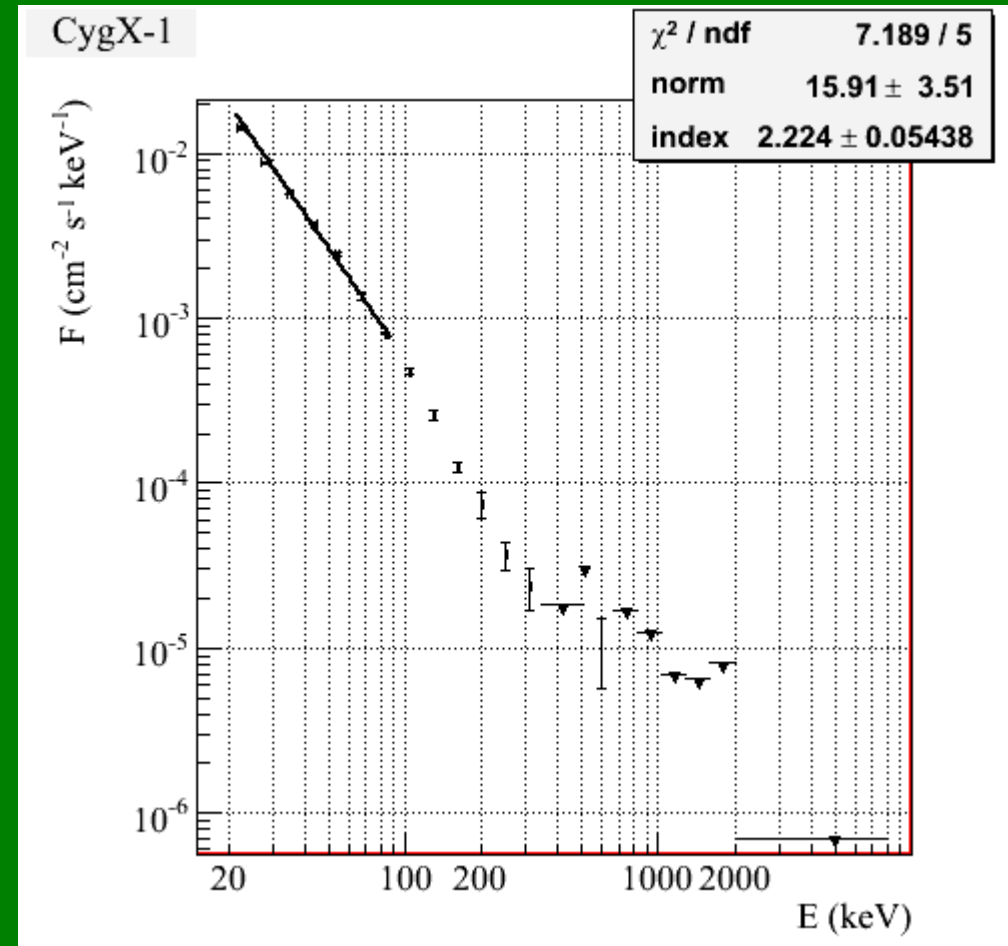
## Status:

- First version operational
- Also applied to the generation of quicklook point source results for all public revolutions  
(*see poster no. 30 and OSA 7 newsletter*)
- Processing of a larger dataset is not yet completed
- Today can only show sensitivity estimates

Spectra from single revolutions:

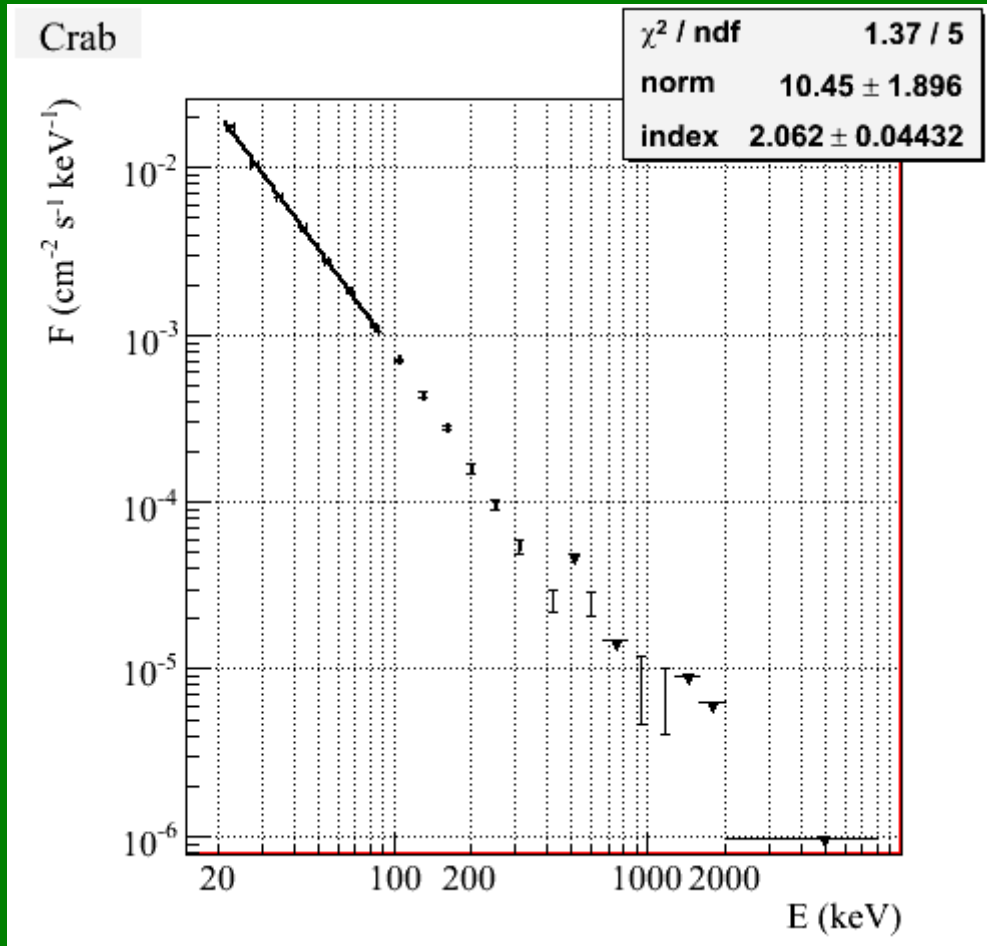


(exposure =  $1.2\text{E}+6 \text{ cm}^2\text{s} \approx 2.4 \text{ ks}$ )

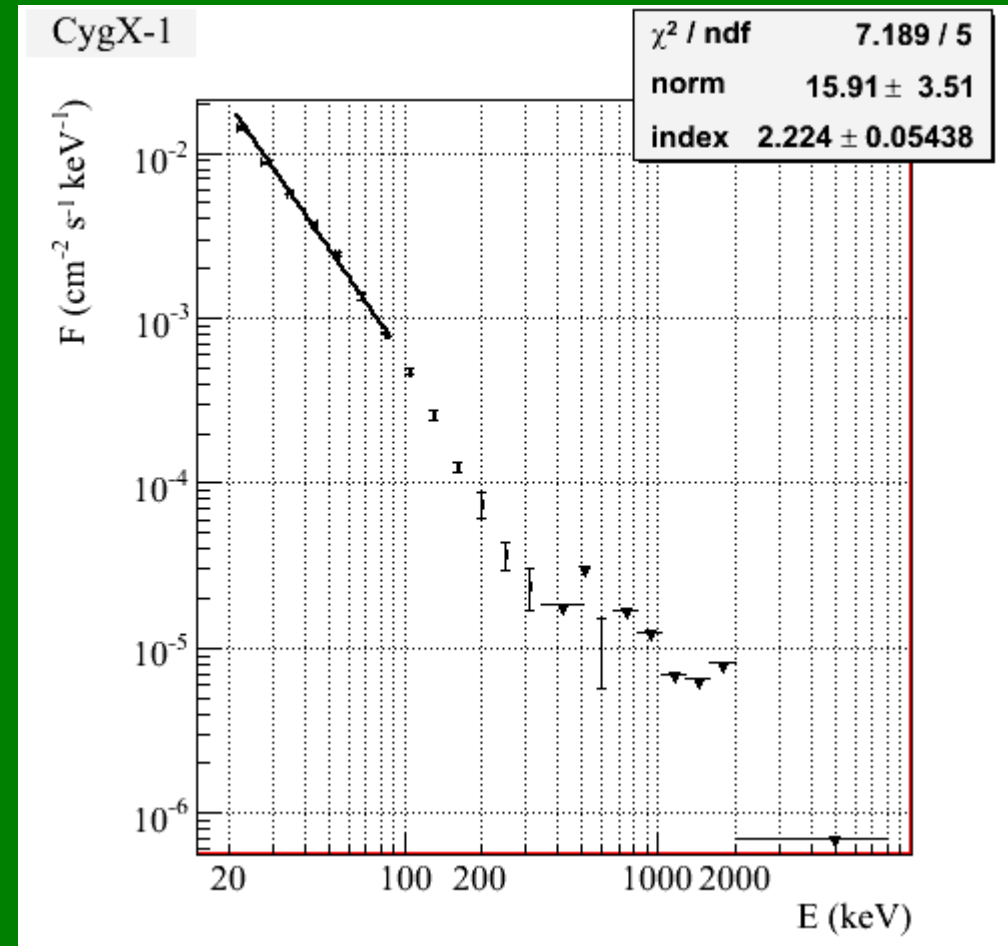


(exposure =  $4.2\text{E}+5 \text{ cm}^2\text{s} \approx 0.8 \text{ ks}$ )

Spectra from single revolutions:



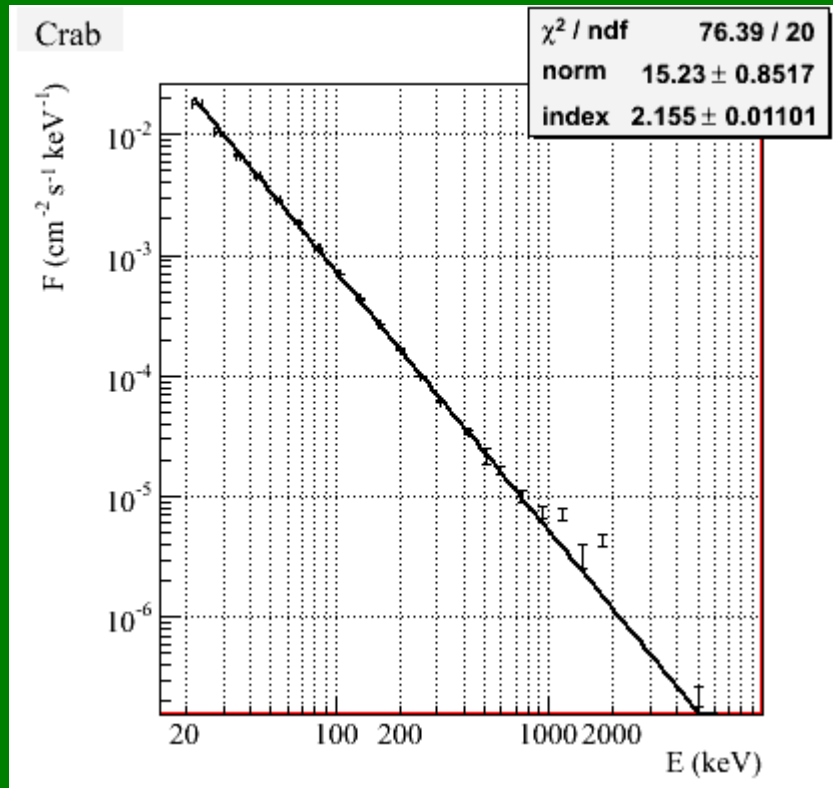
(exposure =  $1.2\text{E}+6 \text{ cm}^2\text{s} \approx 2.4 \text{ ks}$ )



(exposure =  $4.2\text{E}+5 \text{ cm}^2\text{s} \approx 0.8 \text{ ks}$ )

# SPI pointsource sensitivity

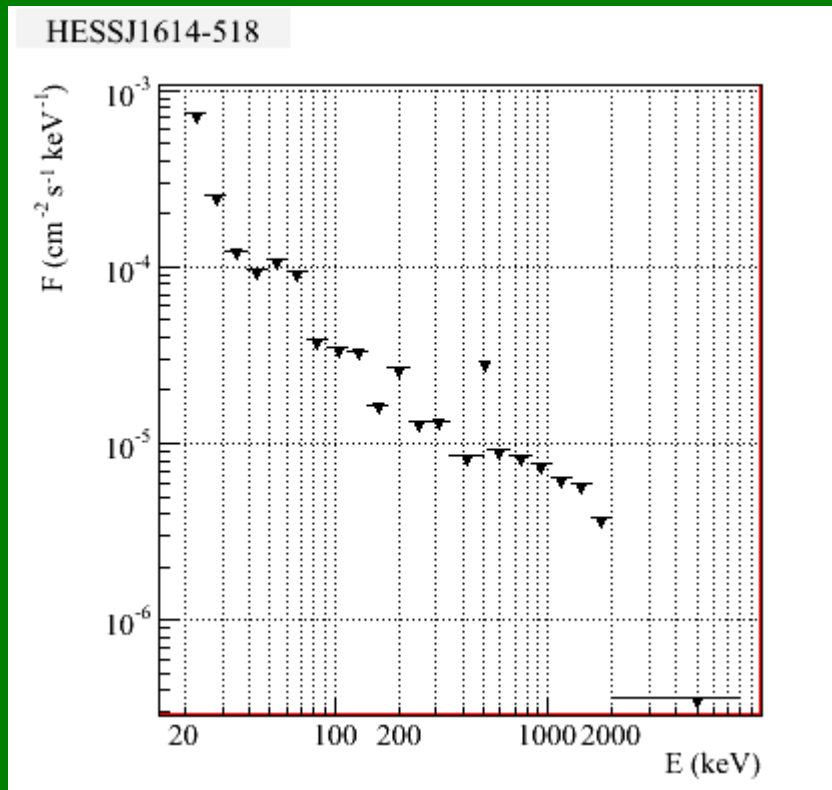
Average of spectra from AO1 (approx. rev. 21 – 163): Crab



(exposure =  $1.75\text{E}+7 \text{ cm}^2\text{s} \approx 35 \text{ ks}$ )

# SPI pointsource sensitivity

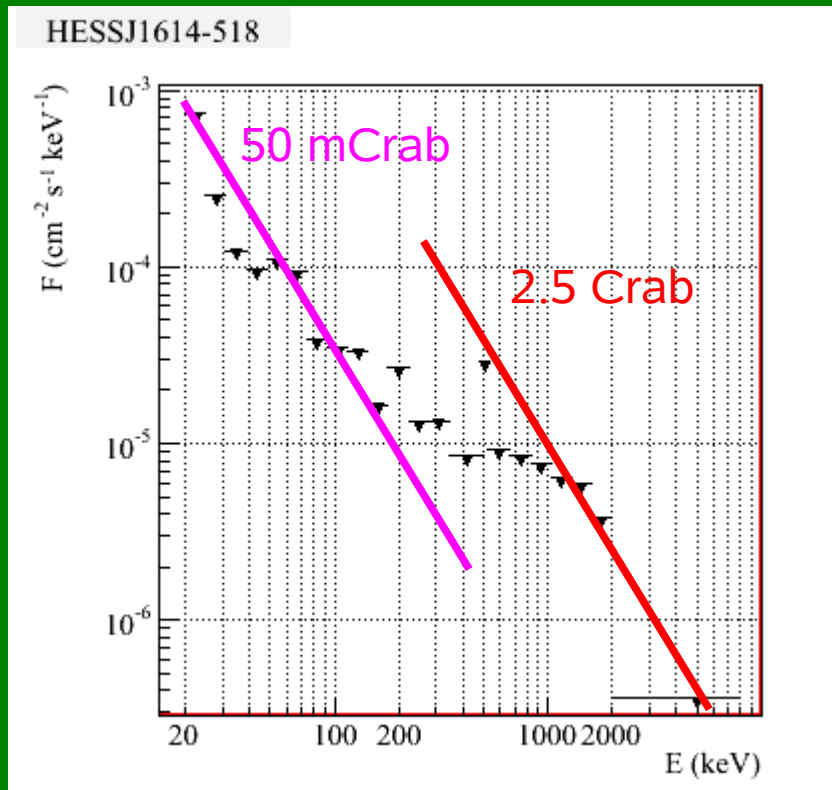
Average of spectra from AO1 (approx. rev. 21 – 163): galactic UNID HESS J1614-518



(exposure =  $1.58 \times 10^7 \text{ cm}^2 \text{s} \approx 32 \text{ ks}$ )

# SPI pointsource sensitivity

Average of spectra from AO1 (approx. rev. 21 – 163): galactic UNID HESS J1614-518



After 32 ks (8.9 h):

50 mCrab up to 200 keV

2.5 Crab above 1 MeV

After 5 Ms:

( $\sqrt{T1/T2} = 12.5$ )

4 mCrab up to 200 keV

200 mCrab above 1 MeV

(exposure =  $1.62E+7 \text{ cm}^2\text{s} \approx 32 \text{ ks}$ )



## Conclusion

- At MPE, work on SPI point source survey analysis is ongoing
- A first analysis pipeline is in place based on spimodfit (now also in OSA)
- Results for a condensed catalog of bright source candidates are online (revolution by revolution, see poster 30)
- Application of the pipeline to particular groups of sources has now started.
- For galactic TeV sources expect to reach sensitivities between 4 mCrab (up to 200 keV) and 200 mCrab (above 1 MeV)
- Source models need to be further refined to extract detailed spectra. Collaborators very welcome ...