

SUMMARY OF CRAB CALIBRATIONS

2003 5x5: 495 ks other : 281 + 880 ks

2004 5x5: 95 ks other : 266 ks

2005 5x5: 90 ks other : 176 ks

2006 5x5: 45 ks other : 205 ks

2007 5x5: 190ks other : 224 ks

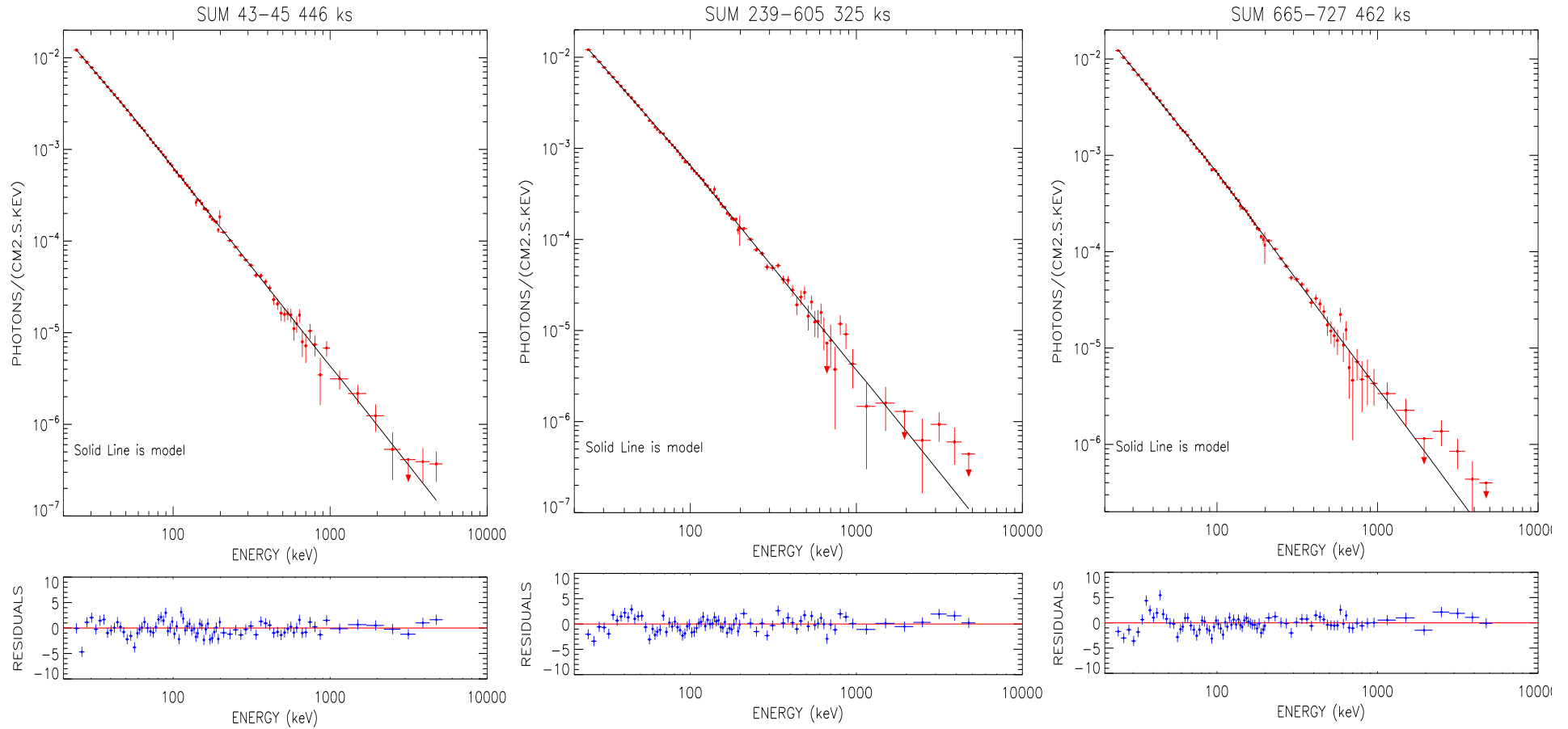
2008 5x5: 800ks other : 0 ks

2009 5x5: 48ks other: 140 ks

CRAB OBSERVATIONS

- Beginning of the mission
Rev 43-44-45 446 ks
- Regular calibration campaigns
Rev 239-300-365-422-483-541-605 325 ks
5X5 patterns
- 2008 campaign
Rev 665-666-727 (728) 5X5 patterns 462 ks

SUM for 3 periods



Fit with a broken power law ; Ebreak = 100 keV

*IOCG Meeting February 11th, 2009
E. Jourdain «SPI Calibration Status»*

Fit results with a Broken Powerlaw model

Rev #	Duration (ks)	Index 1	break (keV) fixed	Index 2	Reduced χ^2 (35 dof)	Norme @ 100 keV (ph/cm ² s keV)
239	31	2.07 +/- 0.02	100	2.36 +/- 0.1	1.32	6.35 10 ⁻⁴
300	38	2.09 +/- 0.02	100	2.23 +/- 0.1	1.67	6.35 10 ⁻⁴
365	30	2.06 +/- 0.02	100	2.34 +/- 0.1	0.99	6.6 10 ⁻⁴
422	39	2.09 +/- 0.02	100	2.20 +/- 0.1	1.17	6.4 10 ⁻⁴
483	32.5	2.11 +/- 0.02	100	2.20 +/- 0.1	1.85* No standard Dithering	6.3 10 ⁻⁴
541	71.5	2.08 +/- 0.02	100	2.21 +/- 0.1	0.95	6.3 10 ⁻⁴
605	84	2.08 +/- 0.02	100	2.20 +/- 0.1	1.7	6.4 10 ⁻⁴
Sum1 239-605	326	2.08 +/- 0.01	100	2.23 +/- 0.05	1.62 (110 dof)	6.44 10 ⁻⁴
665	146.5	2.07 +/- 0.01	100	2.23 +/- 0.05	1.23	6.6 10 ⁻⁴
666	154	2.07 +/- 0.02	100	2.23 +/- 0.05	1.7	6.6 10 ⁻⁴
Sum2 239-666	626.5	2.07 +/- 0.02	100	2.23 +/- 0.05	2.36 (110 dof)	6.5 10 ⁻⁴

Energy break fixed

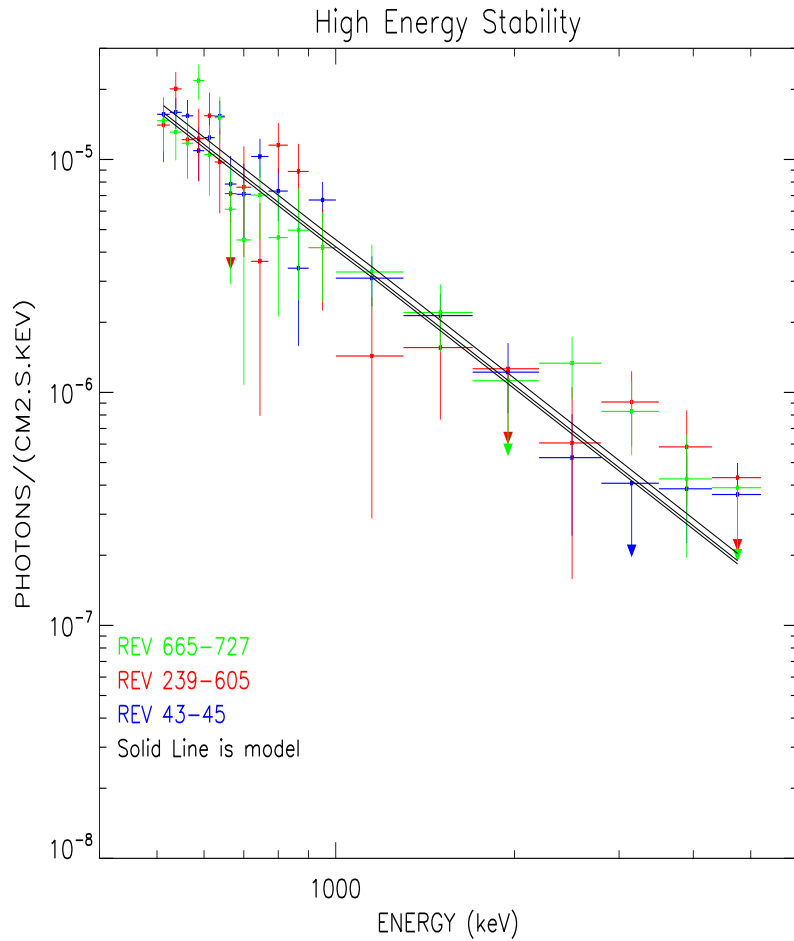
Rev #	Index 1	Ebreak (keV)	Index 2	Norme @ 100 keV (ph/cm ² s.keV)
Sum 1	2.07	100	2.24	6.6 10 ⁻⁴
Sum 2	2.07	100	2.25	6.55 10 ⁻⁴
Sum 3	2.065	100	2.25	6.7 10 ⁻⁴

Energy break free

(0% systematic)

Rev #	Index 1	Ebreak (keV)	Index 2	Norme @ 100 keV (ph/cm ² s keV)
Sum 1	2.02	54	2.17	6.6 10 ⁻⁴
Sum 2	2.05	68	2.19	6.4 10 ⁻⁴
Sum 3	2.03	62	2.18	6.5 10 ⁻⁴

ABOVE 500 keV

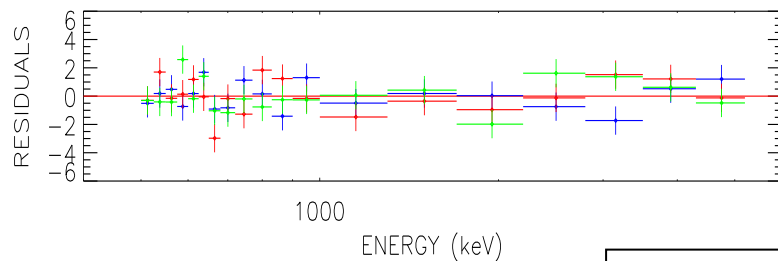


Fit between 500 keV - 6 MeV

Power law Index ~ 2 .

Flux @ 1 MeV :

4.2	10^{-6}	ph/cm2 s.keV
3.8	10^{-6}	ph/cm2 s.keV
3.9	10^{-6}	ph/cm2 s.keV



CONCLUSIONS

THANKS TO LONG EXPOSURES, INVESTIGATIONS ON

- SYSTEMATIC EFFECT (above ~ 700 keV)
- EMPTY FIELDS
- STABILITY OF THE GAIN CORRECTION AT HIGH ENERGY
- INSTRUMENT STABILITY AT HIGH ENERGY



RELIABLE DATA UP TO A FEW MEV
IN THE STANDARD 5X5 PATTERN

REVOLUTION 774

5x5 Pattern

38 ks live time

Significant background variability

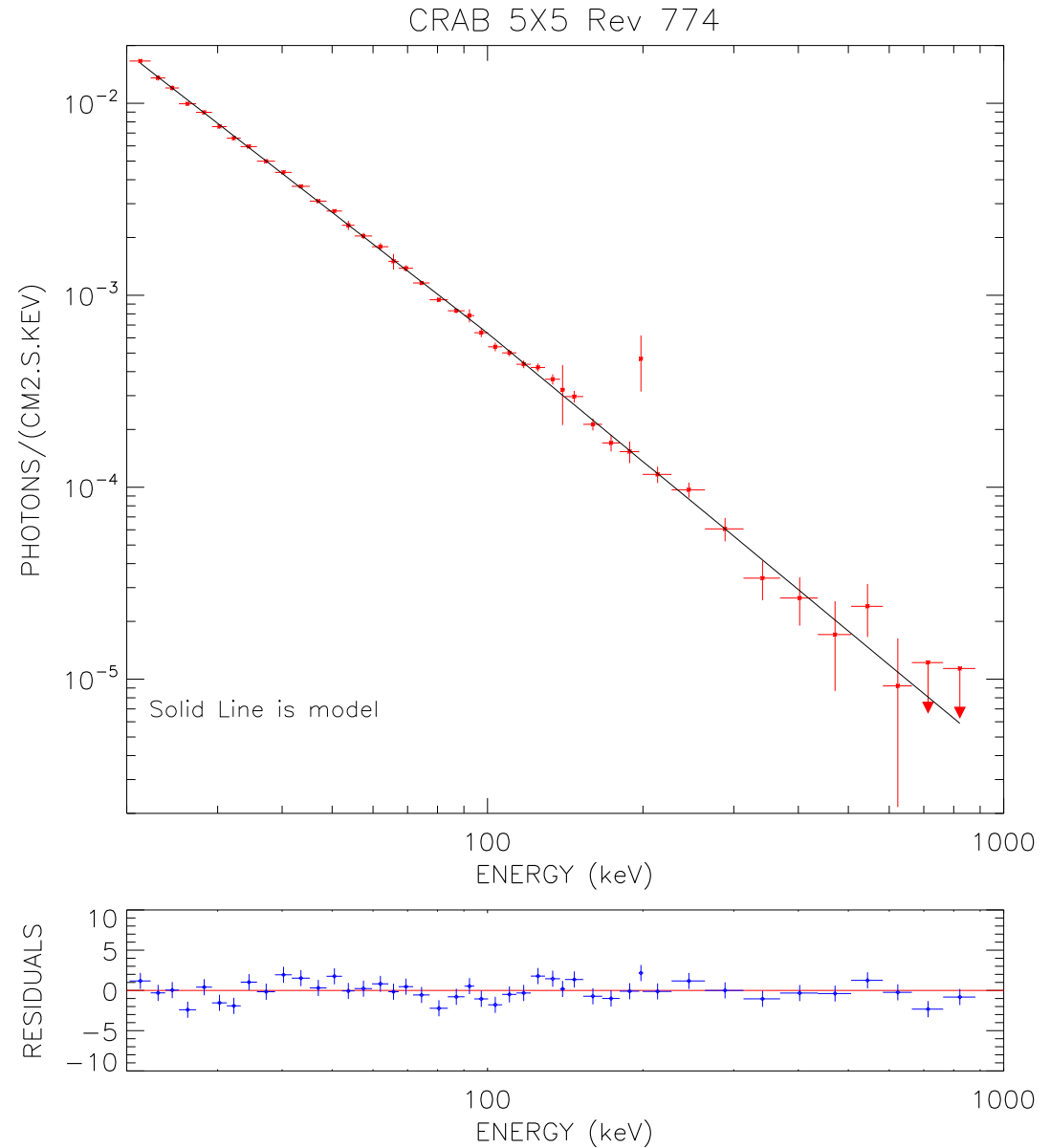
Residual at 198 keV

Index 1: 2.09

Break Fixed = 100 keV

Index 2 = 2.22

FLUX @100keV= 6.536 E-4



FUTURE CALIBRATIONS

ONE PATTERN (50ks) PROVIDES « ENOUGH » STATISTICS UP TO ~ 200 keV

- Each annealing increases the central hole size: the high energy efficiency will necessarily decrease.
- 4 Revs allows a good control of SPI up to ~2 MeV
- AIM is to obtain

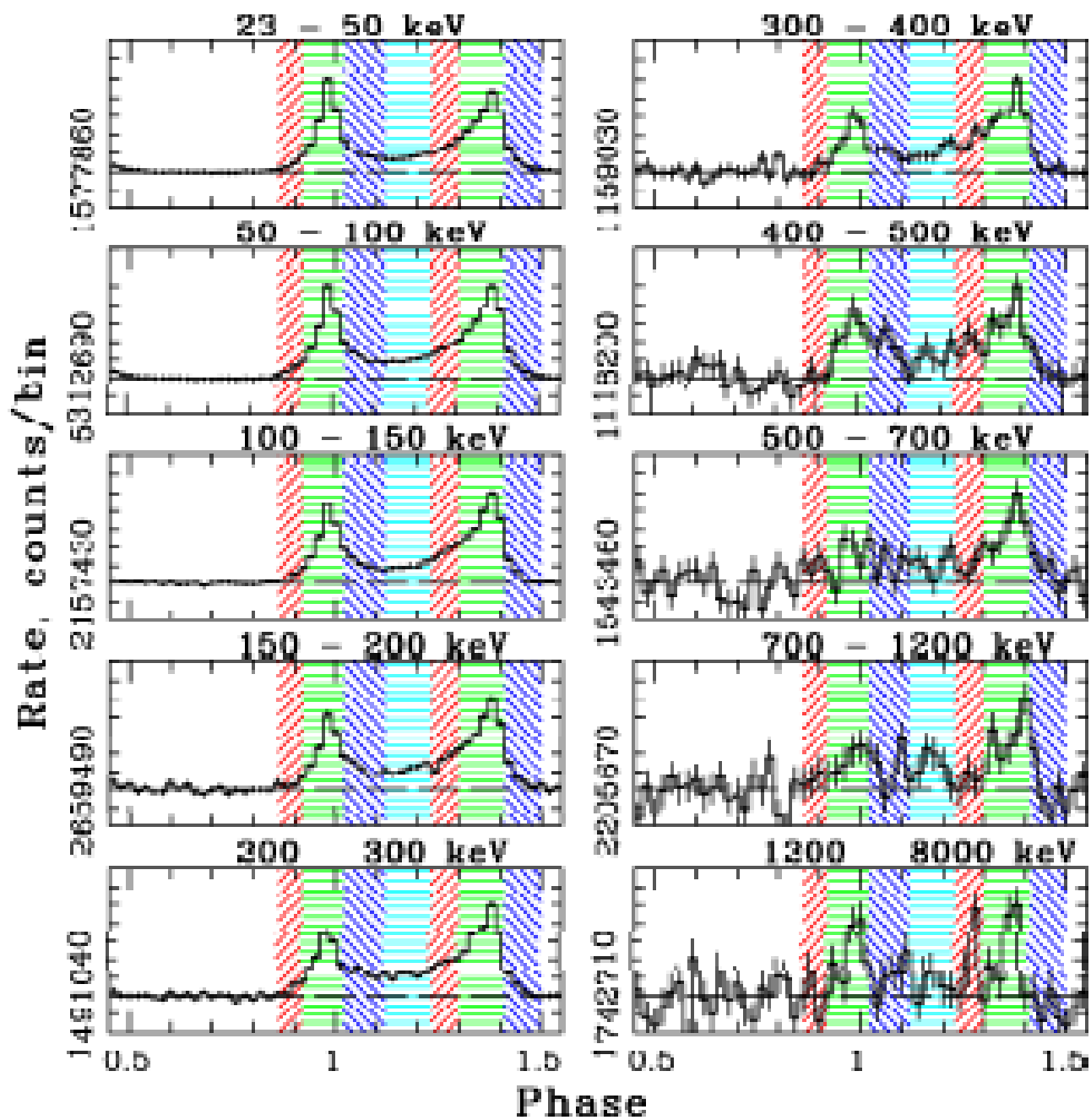
RELIABLE DATA UP TO A FEW MEV
IN THE STANDARD 5X5 PATTERN
AND
REFERENCE SPECTRA FOR CROSS-CALIBRATION

« good » cross calibration only exists for 16 ks !

Failure of GeD 5

- Need to compute new calibration matrices
 - Done
- Then control !

Crab pulsar



Crab Pulsar: Radio phase versus SPI phase

