Results from Rossi X-ray Time Explorer

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1 – Observations
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1 - Observations

30 pointings of 1.5 ks each, essentially all them within the time window of the (>2 hours) observations performed with MAGIC

Specific Observing pointings (dates and duration) can be found here

https://www.slac.stanford.edu/exp/glast/MW/Mrk501_2008/PublicHtml/Online/M501_Obs.html

All observations but one were successful. The problematic day: May 9th

PCU 2 experienced an unexpected trip-off before the observation. Since PCU 2 was the only PCU scheduled to be on for these observations, we remained without data.

2 – Data reduction

Thanks to Greg Madejski, Luigi Costamante and Andrea Tramacere !!

Proportional Counter Array (PCA)

(Only PCU2 was used)

Data reduced with the "standard" perl script REX

I use the following selection of events:

ELV > 10.0 && OFFSET < 0.02 && PCU2_ON == 1 && (TIME_SINCE_SAA < 0 || TIME_SINCE_SAA > 30) && ELECTRON2 < 0.1

Only the first layer was used to increase the signal/noise ratio

Instrument response function computed with script pcarsp

Spectra computed and fitted using Xspec 11

Channels 0-2 excluded
Channels grouped as

3 -19	1
20 22	3
23 25	3
26 30	5
31 39	9
40 79	10

Fit performed with power law function in range 2.5 keV-20 keV

High Energy X-ray Timing Experiment (HEXTE)

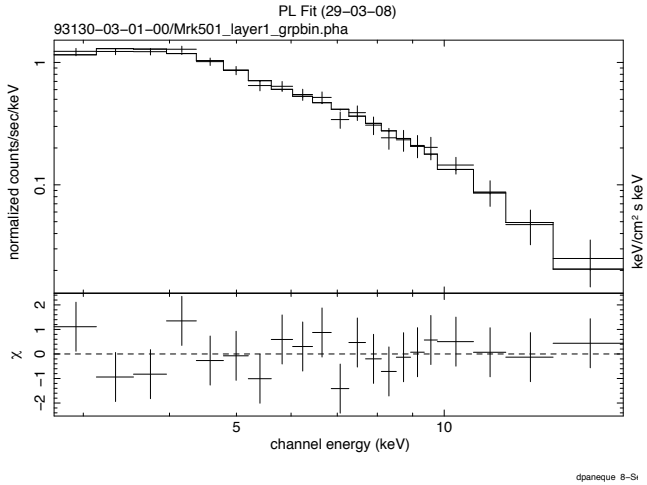
No net signal observed with HEXTE

3 – Results

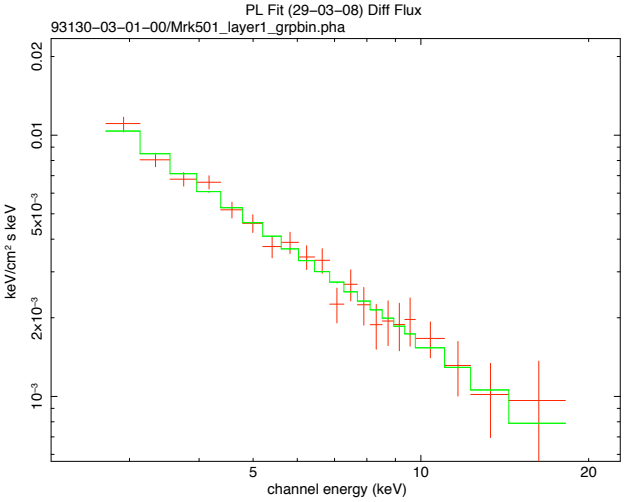
Clear detection in each of the 29 successful observations
All days can be nicely fit with the simple power law function

Plots from each of the single observations can be found here:
https://www.slac.stanford.edu/exp/glast/MW/Mrk501_2008/DetailedAnalysis/Data/RXTE/PlotsFromDataReduction/

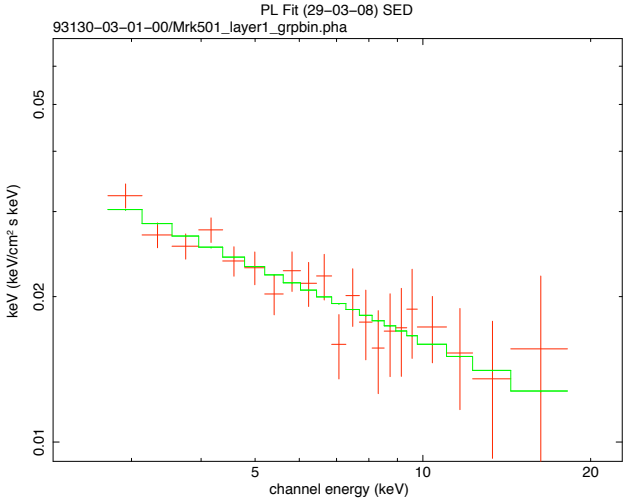
Spectral fits/



DifferentialFlux/



SED/



Data points model (power law)

3 – Results

Clear detection in each of the 29 successful observations
All days can be nicely fit with the simple power law function

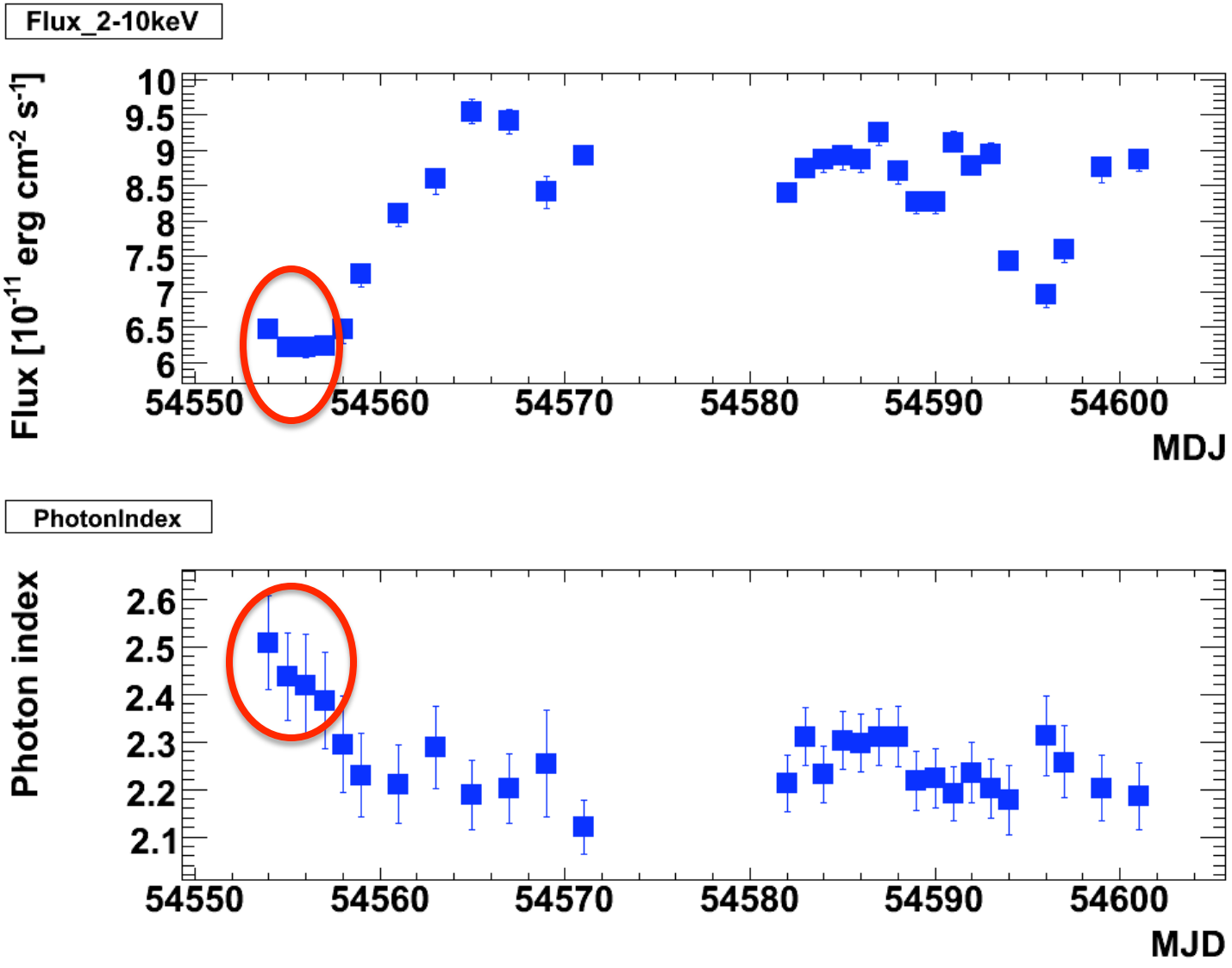
MDJ	Norm Factor (keV/cm^2 s keV)	photon index	Chi2/ndf
54554	0.0523 0.00747 0.00876	2.51 0.097 0.099	10.5/19
54555	0.0455 0.0062 0.00719	2.44 0.091 0.094	15.2/19
54556	0.0443 0.00682 0.00808	2.42 0.103 0.107	19.9/19
54557	0.0424 0.00631 0.00744	2.38 0.099 0.103	15.8/19
54558	0.0386 0.00584 0.00688	2.29 0.1 0.102	13.1/19
54559	0.0394 0.00534 0.00617	2.23 0.087 0.09	11.6/19
54561	0.0429 0.00551 0.00629	2.21 0.082 0.084	14.2/19
54563	0.0509 0.00669 0.00769	2.29 0.085 0.087	8.11/19
54565	0.0489 0.00566 0.0064	2.19 0.074 0.074	9.82/19
54567	0.0492 0.00564 0.00635	2.2 0.073 0.074	17.2/19
54569	0.0474 0.00807 0.00971	2.25 0.111 0.115	14.1/19
54571	0.0413 0.0037 0.00406	2.12 0.056 0.056	12.2/19
54582	0.0446 0.00422 0.00466	2.21 0.06 0.06	17.8/19
54583	0.0534 0.00508 0.00562	2.31 0.061 0.062	10.6/19
54584	0.0484 0.00451 0.00496	2.23 0.06 0.059	16.9/19
54585	0.0538 0.00509 0.0056	2.3 0.06 0.062	7.17/19
54586	0.0532 0.00502 0.00555	2.3 0.061 0.061	13.4/19
54587	0.0565 0.0052 0.00571	2.31 0.059 0.059	11.5/19
54588	0.0532 0.00519 0.00576	2.31 0.062 0.064	19.4/19
54589	0.0443 0.00432 0.00477	2.22 0.062 0.063	15/19
54590	0.0445 0.00432 0.00475	2.22 0.061 0.063	14.4/19
54591	0.0469 0.00424 0.00467	2.19 0.057 0.057	10.5/19
54592	0.0481 0.00473 0.00523	2.23 0.062 0.064	14.3/19
54593	0.0468 0.00457 0.00505	2.2 0.061 0.063	10.7/19
54594	0.0374 0.00422 0.00475	2.18 0.072 0.073	19.7/19
54596	0.0427 0.00541 0.00621	2.31 0.083 0.085	10.3/19
54597	0.043 0.00499 0.00565	2.26 0.074 0.077	16.8/19
54599	0.0458 0.0049 0.00546	2.2 0.067 0.069	22.9/19
54601	0.0452 0.00504 0.00566	2.18 0.071 0.071	28.3/19

Summary table

The table shows reports asymmetric errors for the parameters **Norm** and **photon index**, computed with the Xspec function error with a delta Chi2 of 2.3 (for a function with 2 parameters)

The errors low/up are anyhow very similar (almost symmetric)

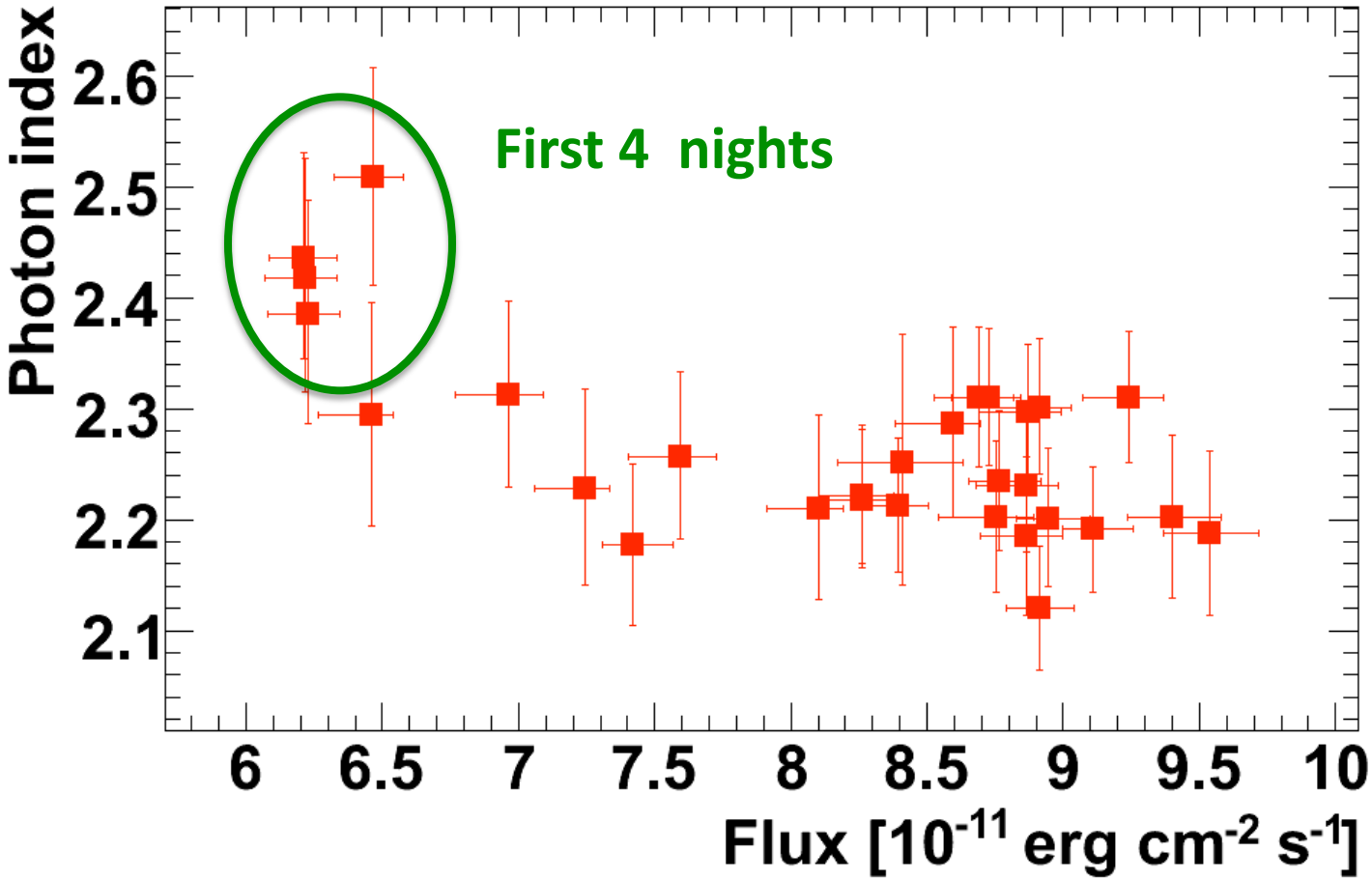
4 – Summary of flux and spectral variations



4 – Summary of flux and spectral variations

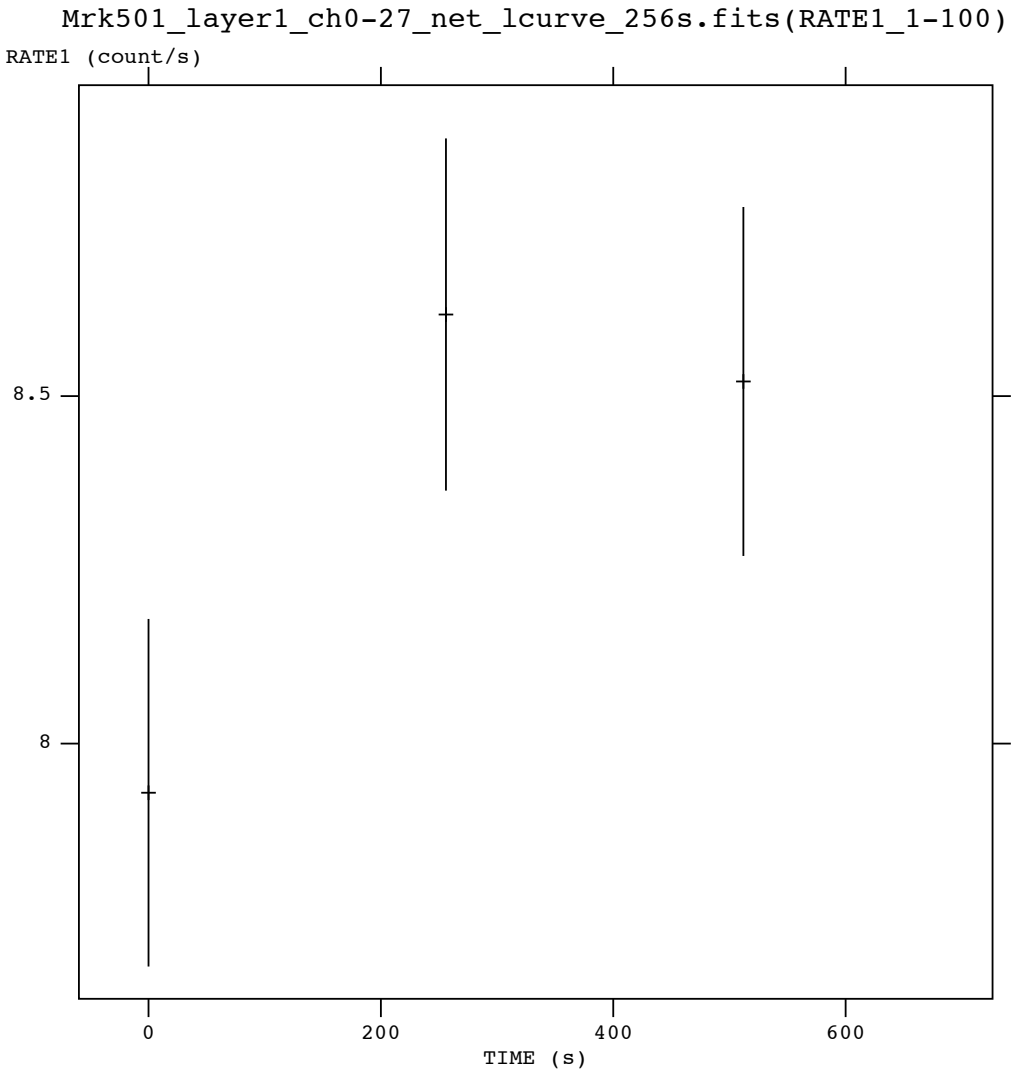
Flux changes by about 50%, yet spectral index remains unchanged (apart from the first 4 days)

Flux_2-10keV_vs_PhotonIndex



4 – Summary of flux and spectral variations

No significant intra-night flux variations



Count rate found using channels 0-27 from PCU2, after background subtraction

The “highest” intra-night flux variations were found for the night MJD=54565, which is one of the days with the highest flux

As you can see it is not very significant