Summary

Group 1: Electron Acceleration and Propagation

Wednesday, 8 June, AM

- Spectral Inversion Methods and Results

Synthetic Mean Electron Flux Distributions & Corresponding Photon Spectra

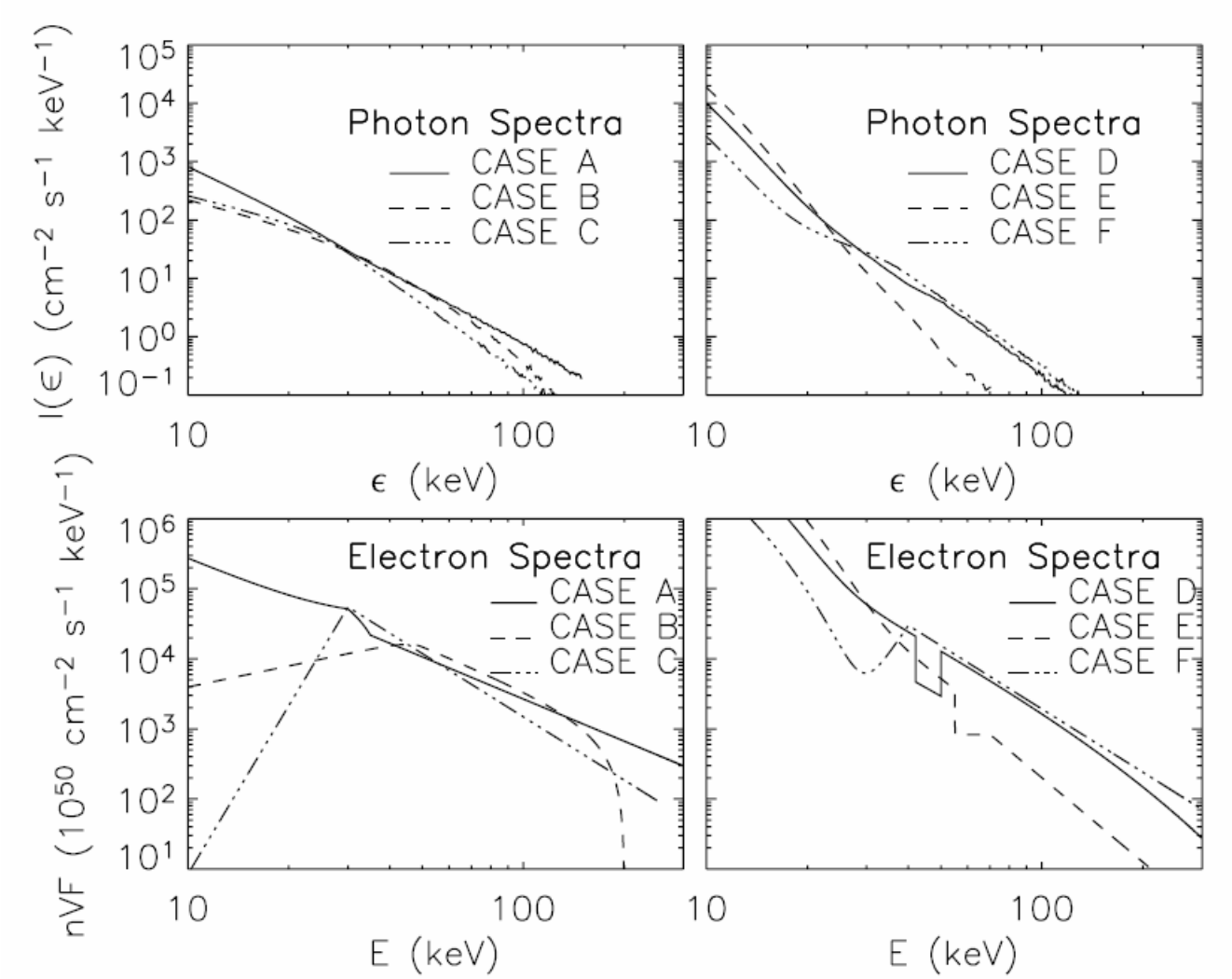
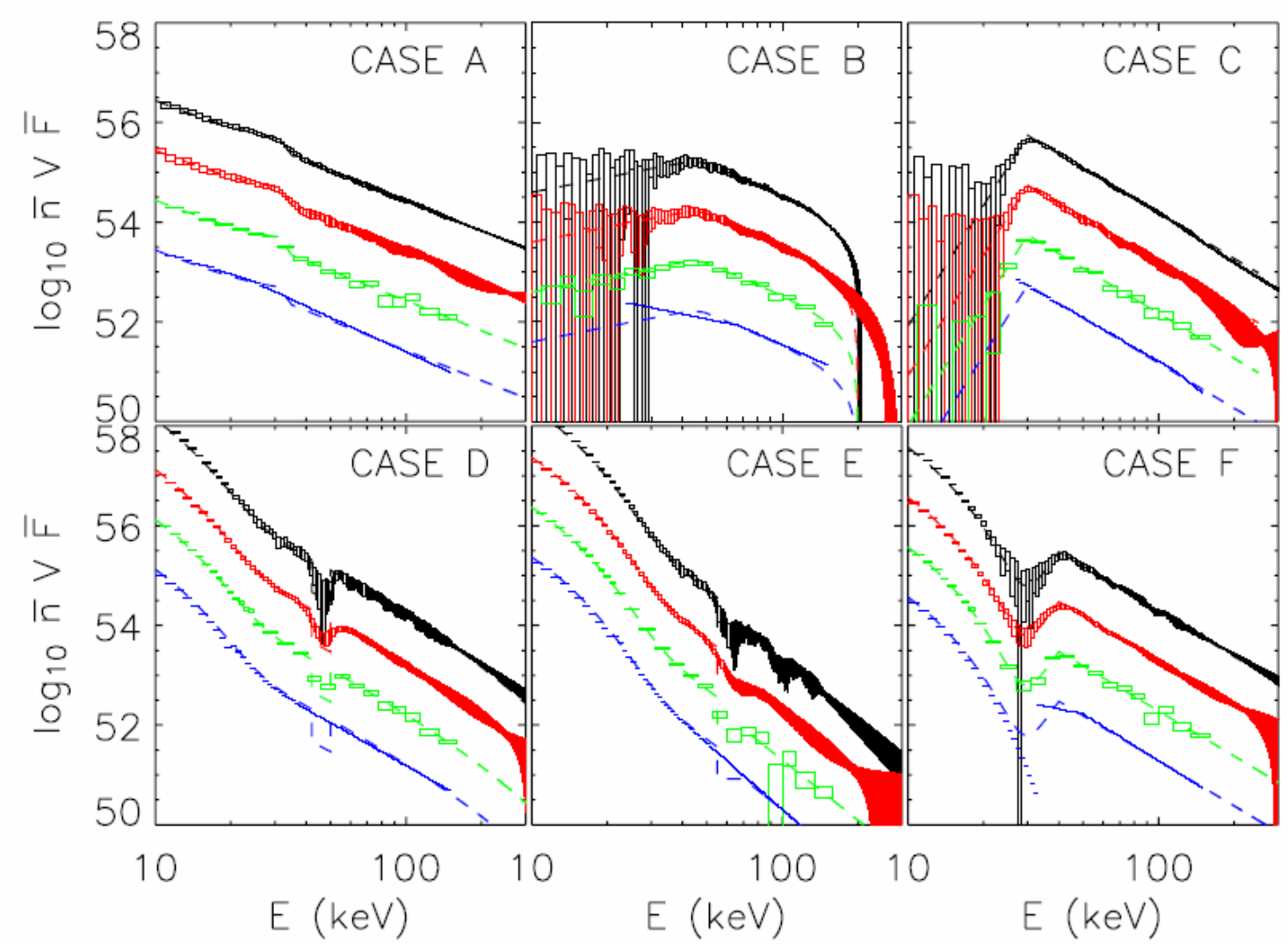


Fig. 1.— Synthetic mean source electron spectra (bottom) and their resulting photon spectra (top) for two sets of three cases each.

Brown et al. 2005

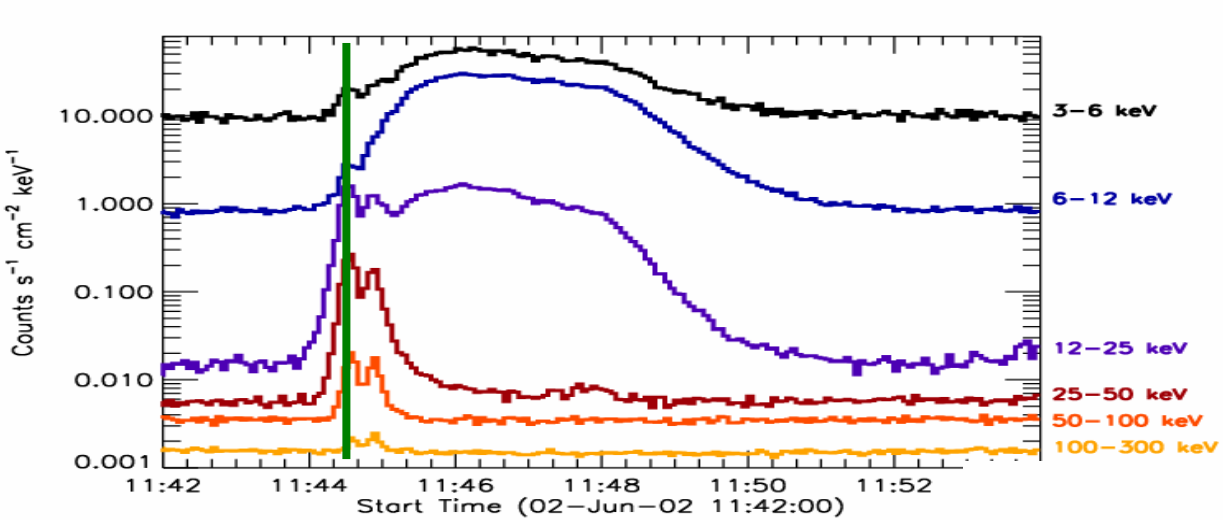
Inversion Results & Forward Fits



Wednesday, 8 June, PM

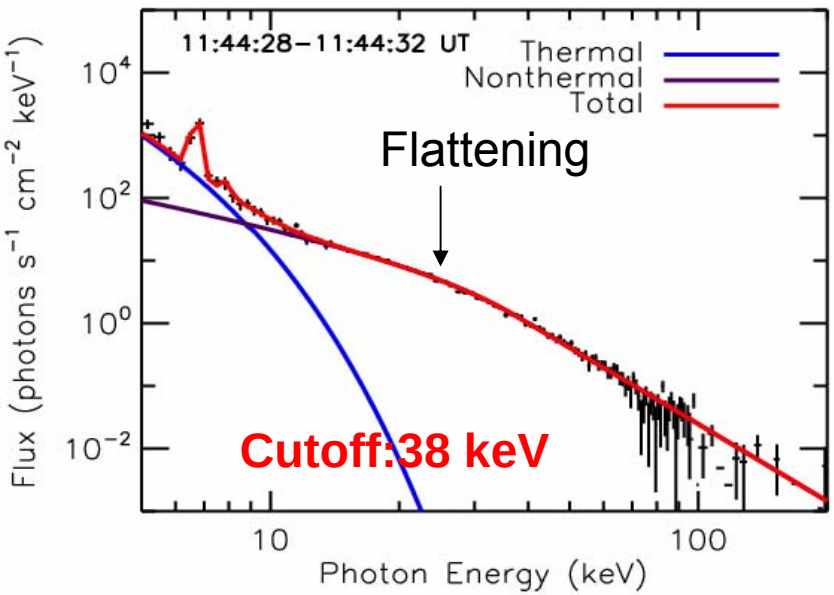
- Determination of low-energy cutoffs and electron energy fluxes from RHESSI hard X-ray spectra
- Impact of albedo on hard X-ray spectra

Spectral Flattening for Early Impulsive Flares



Observation:
Turnover energy correlates with HXR fluxes

Interpretation:
1. Low-energy cutoff (Acceleration)
2. Return current (Transport)
3. Particle trap (Transport)



Sui, Holman, Dennis

EM: 1.5e47 cm^{-3} T: 17 MK Index: 4.8

Effect of Albedo on Determination of Low-Energy Cutoff

Figures:

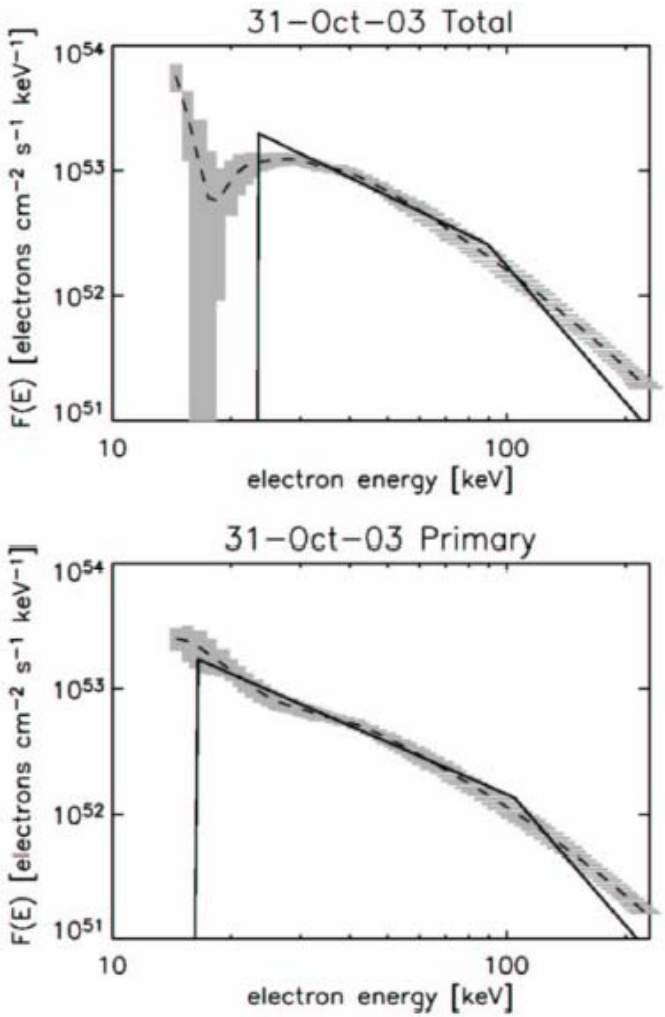
Top: Low-energy cutoff (“dip”) before albedo correction
Bottom: After albedo correction

Statistics

17 flares found in RHESSI flare list with flat (spectral index < 3) spectra

High low-energy cutoffs not found for limb flares

No high low-energy cutoffs required after albedo correction



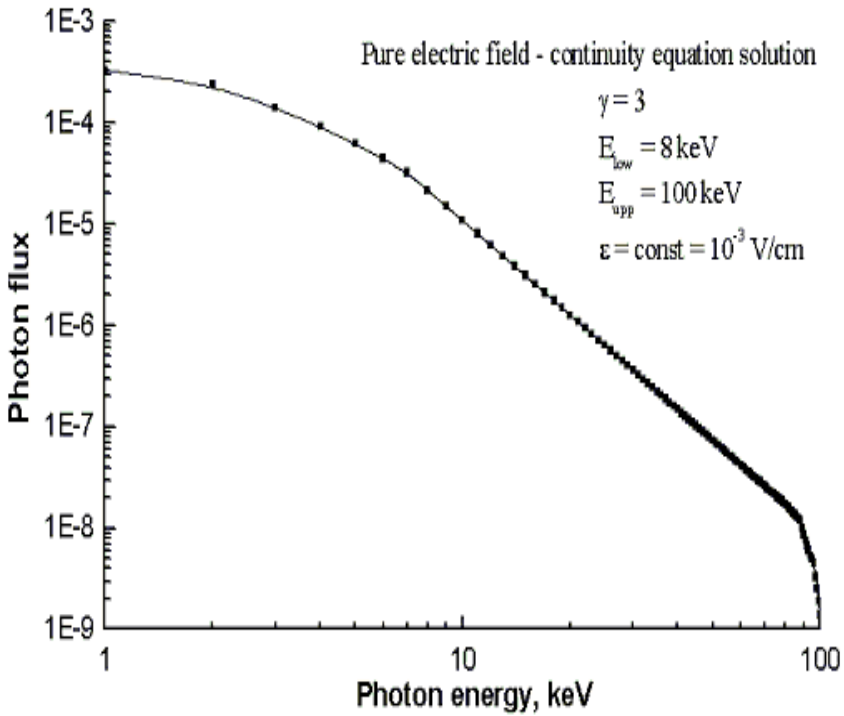
Jana Kasparova & Eduard Kontar

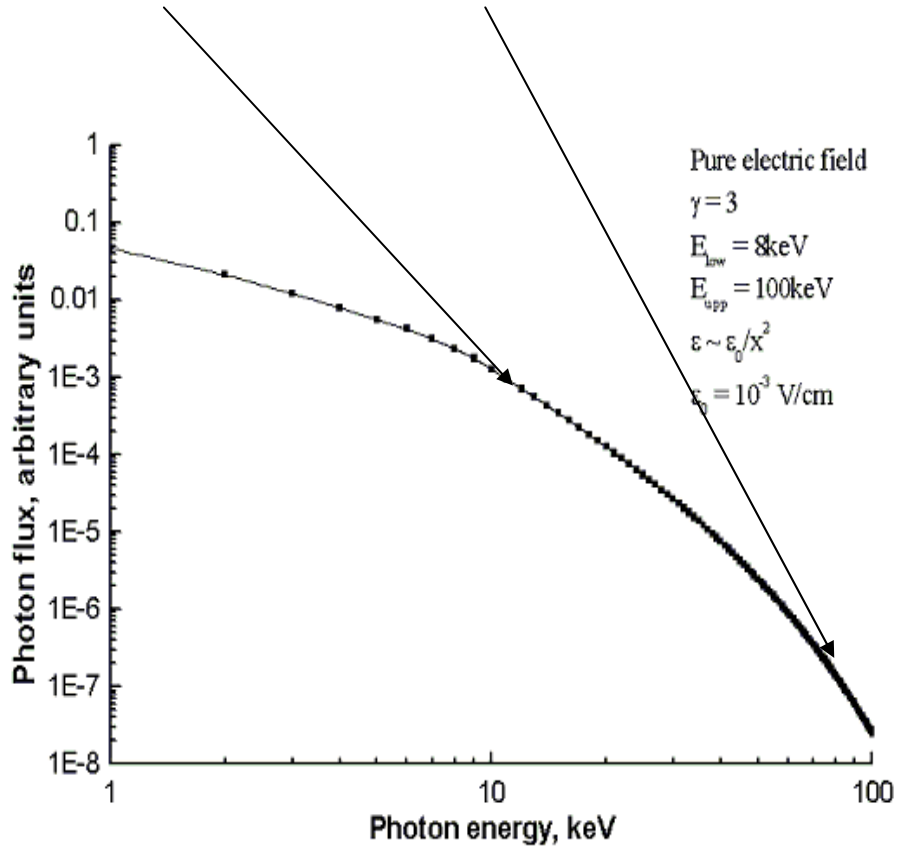
Thursday, 9 June, AM

- Impact of return current and "hot" target on X-ray spectra
- Correlation of flare properties, including spectral index & X-ray flux
- Energy-dependent time delays and electron propagation and trapping

Photon spectra for pure electric field

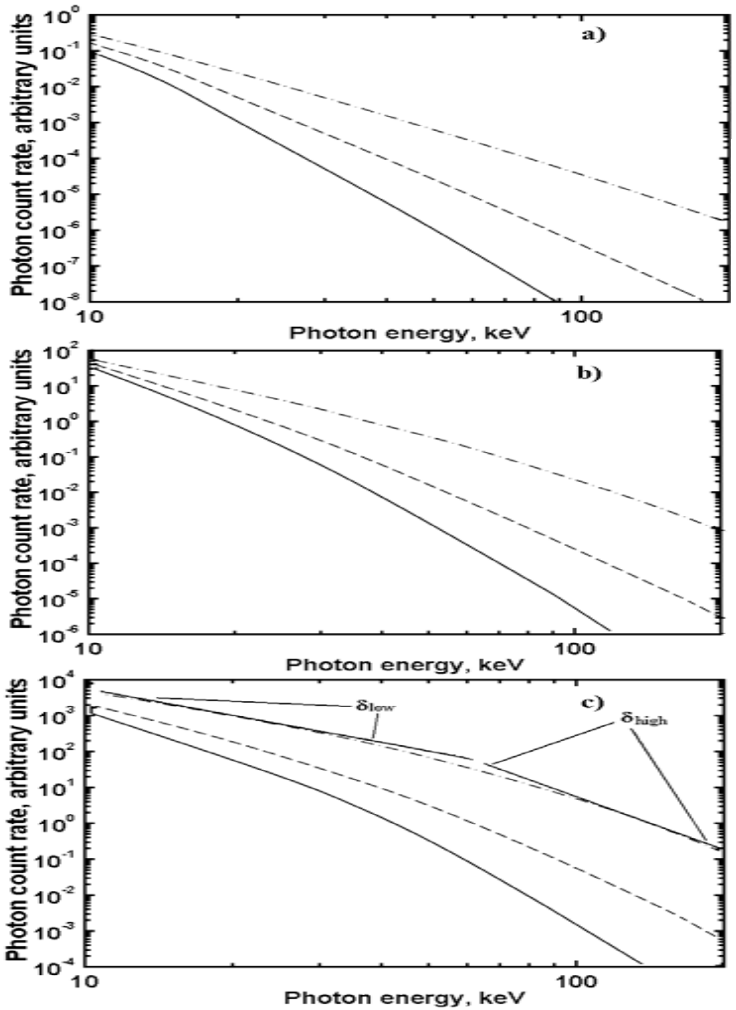
left – constant (δ=3) right - const/variable $1/x^2$ (δ=2.8 & δ=3.9)



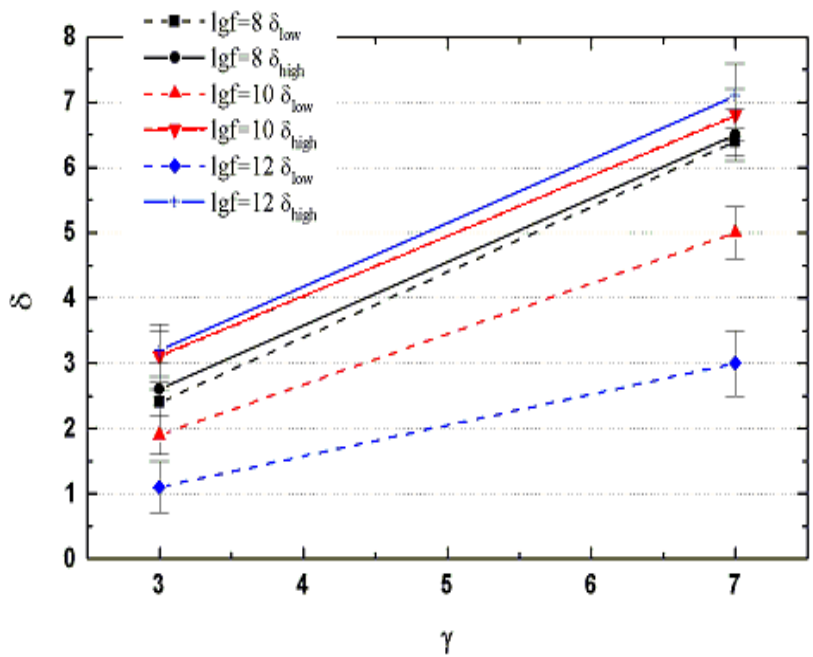


Valentina Zharkova

HXR photon spectra –full kinetics (δ_{low} (Ef)+ δ_{high} (colls))



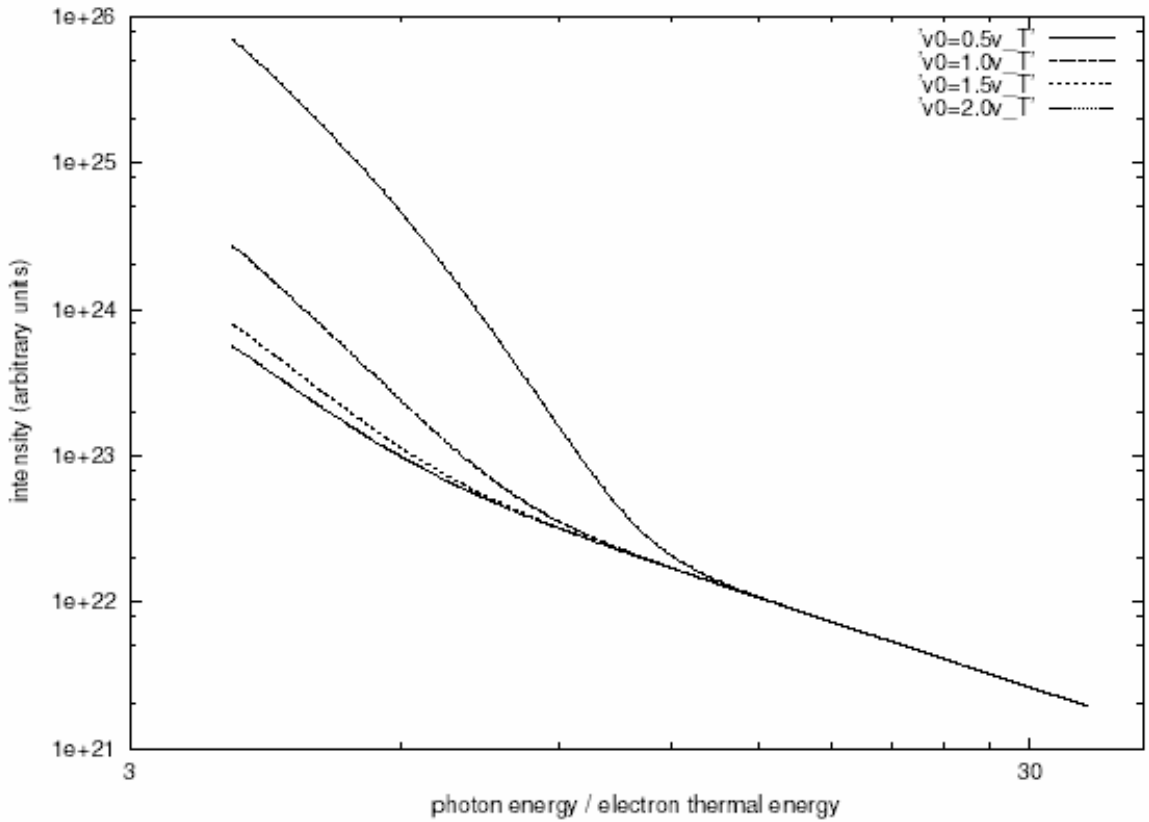
$$j(\xi) = K\sqrt{\frac{2}{m}}\int_E N(\xi, E)\sqrt{E}dE$$



Valentina Zharkova

Example photon spectra

power-law energy distribution relaxing: which one had the lowest low-energy cutoff?

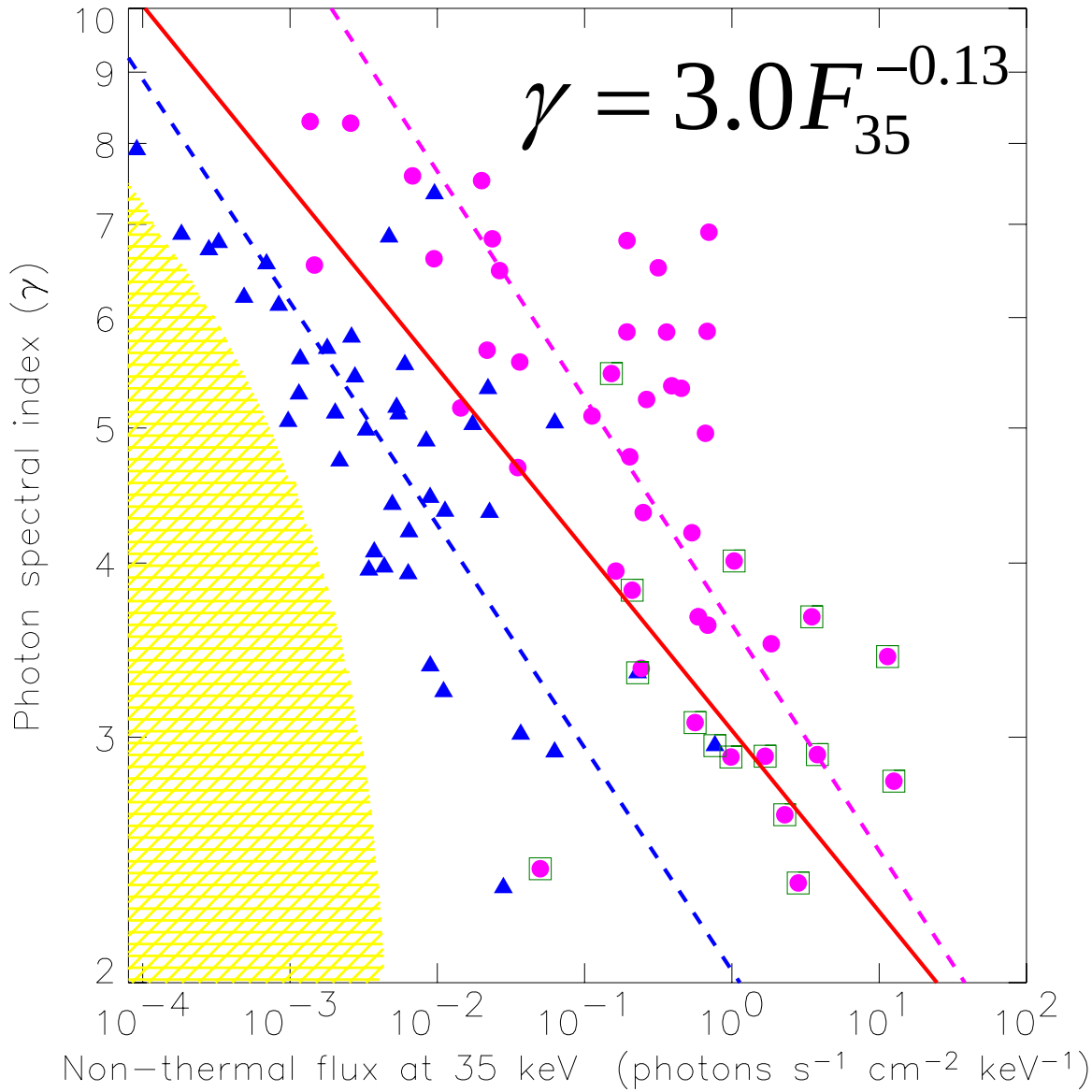


Alec MacKinnon (Galloway et al. 2005)

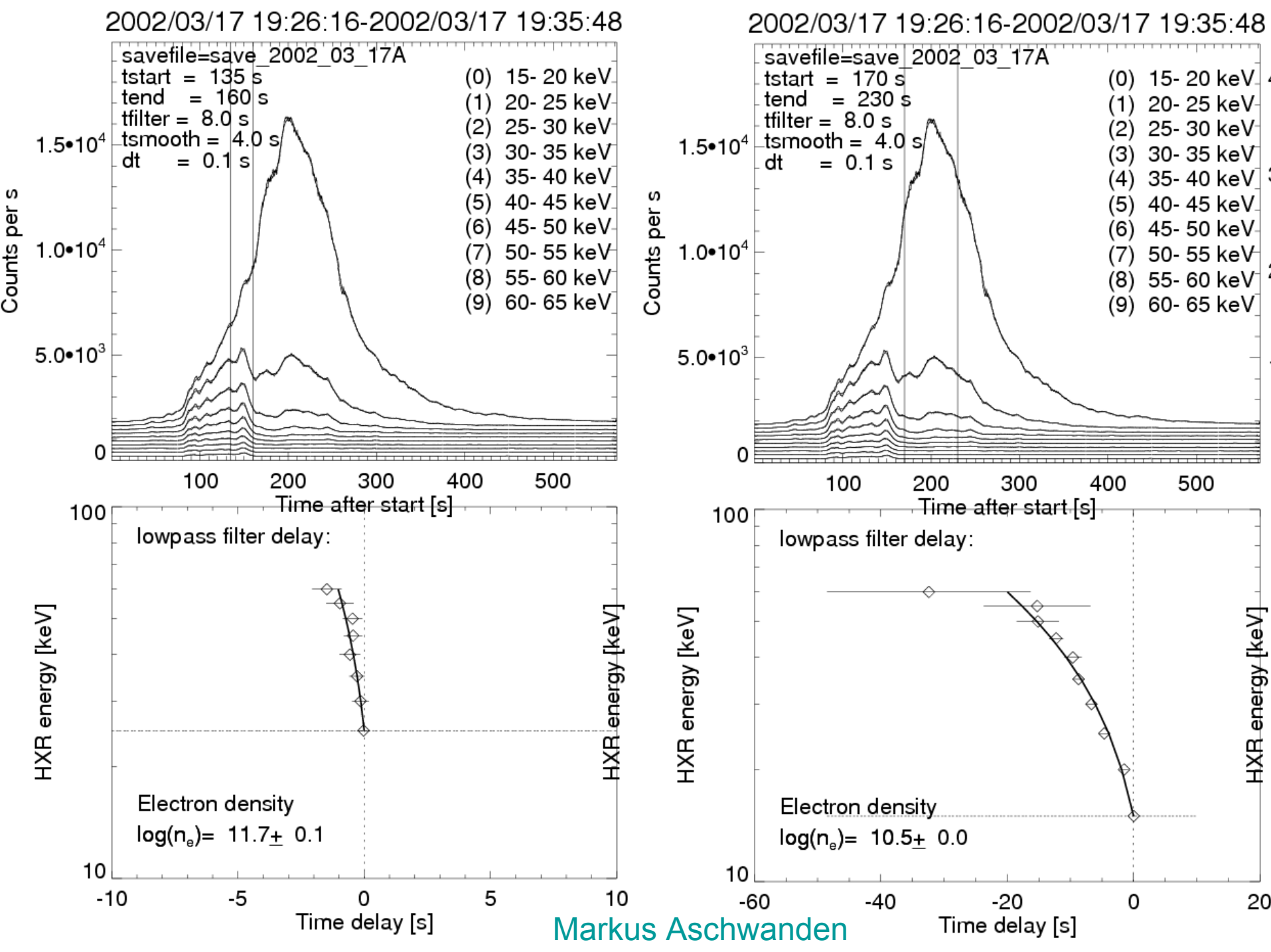
Correlation of Hard X-ray Flux with Spectral Index

Statistical correlation between photon spectral index and photon flux at 35 keV

Relationships between X-ray emitting plasma temperature and emission measure also found



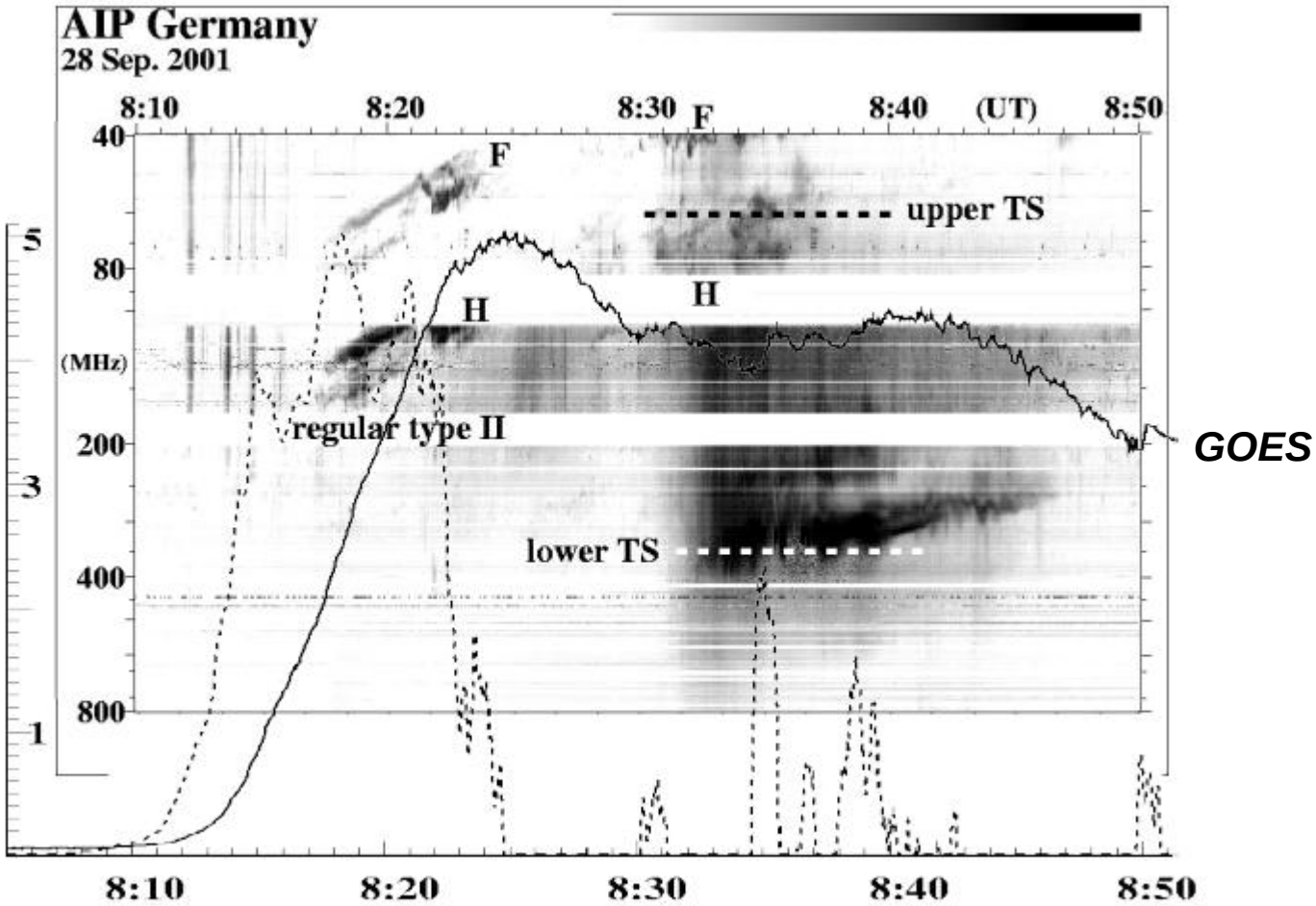
Marina Battaglia


2002/03/17 19:26:16-2002/03/17 19:35:48
savefile=save_2002_03_17A
tstart = 135 s
tend = 160 s
tfilter = 8.0 s
tsmooth = 4.0 s
dt = 0.1 s
(0) 15- 20 keV
(1) 20- 25 keV
(2) 25- 30 keV
(3) 30- 35 keV
(4) 35- 40 keV
(5) 40- 45 keV
(6) 45- 50 keV
(7) 50- 55 keV
(8) 55- 60 keV
(9) 60- 65 keV
Counts per s
Time after start [s]
lowpass filter delay:
HXR energy [keV]
Electron density
log(n_e)= 11.7± 0.1
Time delay [s]
2002/03/17 19:26:16-2002/03/17 19:35:48
savefile=save_2002_03_17A
tstart = 170 s
tend = 230 s
tfilter = 8.0 s
tsmooth = 4.0 s
dt = 0.1 s
Electron density
log(n_e)= 10.5± 0.0
Markus Aschwanden

Friday, 10 June, AM

- Radio evidence for termination shocks
- Review of observations that impact electron acceleration models
- Evolution of reconnection along flare ribbons
- Spectral index vs. photon or electron energy from spectral inversion

Impulsive phase TS - 28 Sept. 2001



„Lower“ and „upper“ TS early in the flare
well discriminated from the „regular“ type II.

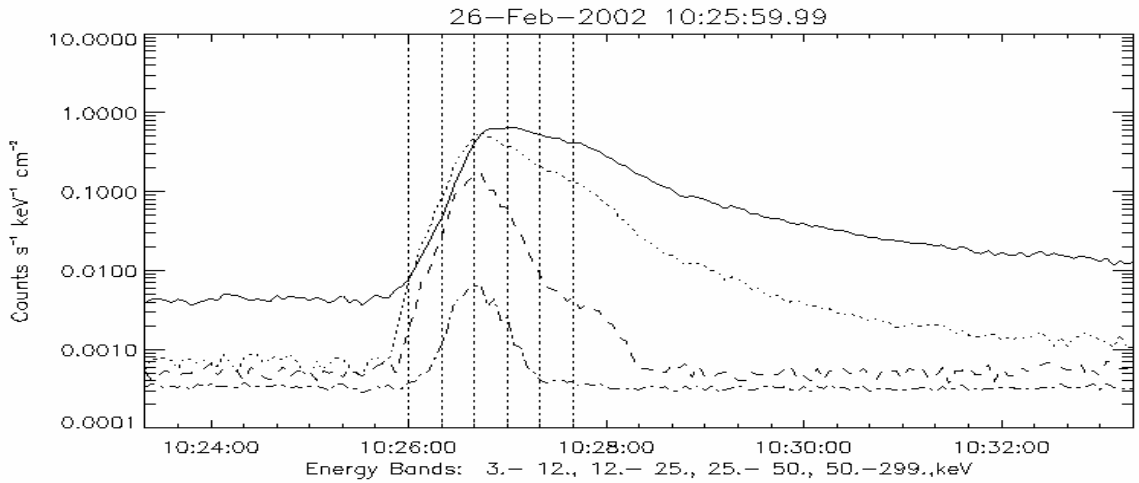
Henry Aurass
Gottfried Mann

9 Nov 2002 Flare:

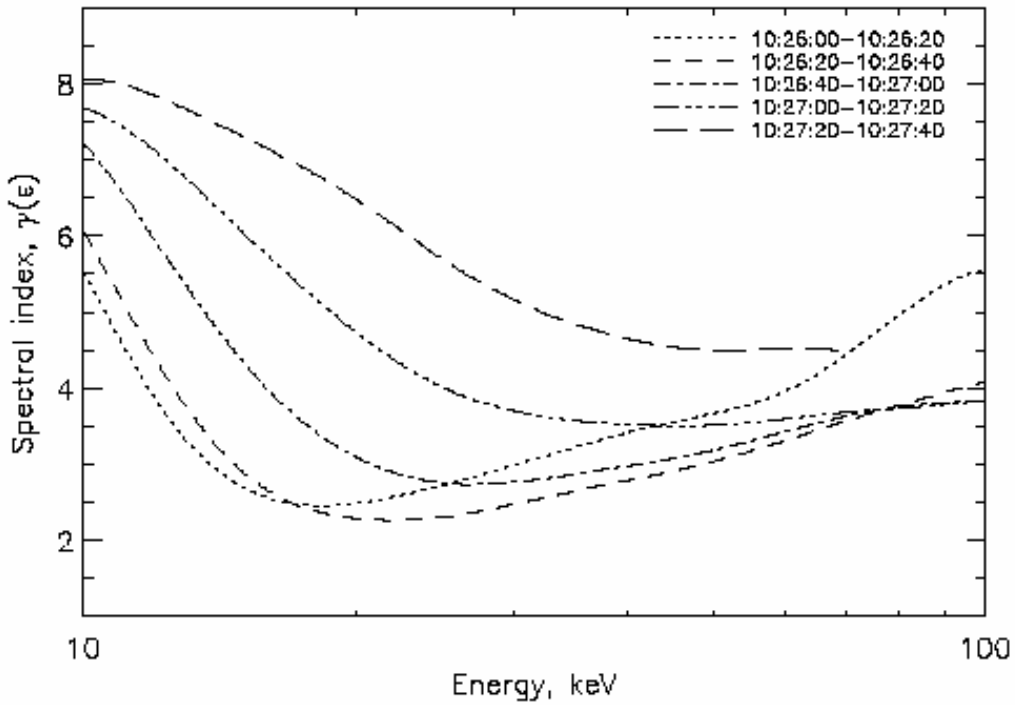
Hard X-ray footpoints propagate along *converging* flare ribbons as flare evolves

Paolo Grigis

Energy dependent photon spectral index



Spectral index evolution:



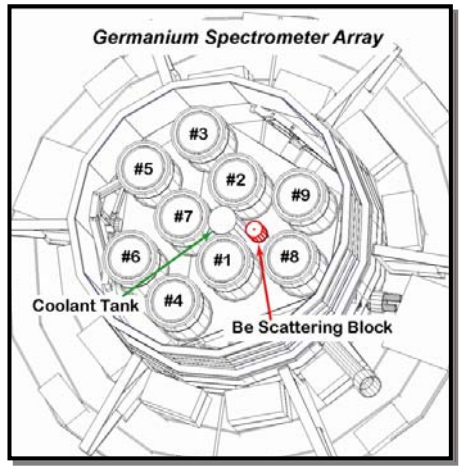
Eduard Kontar

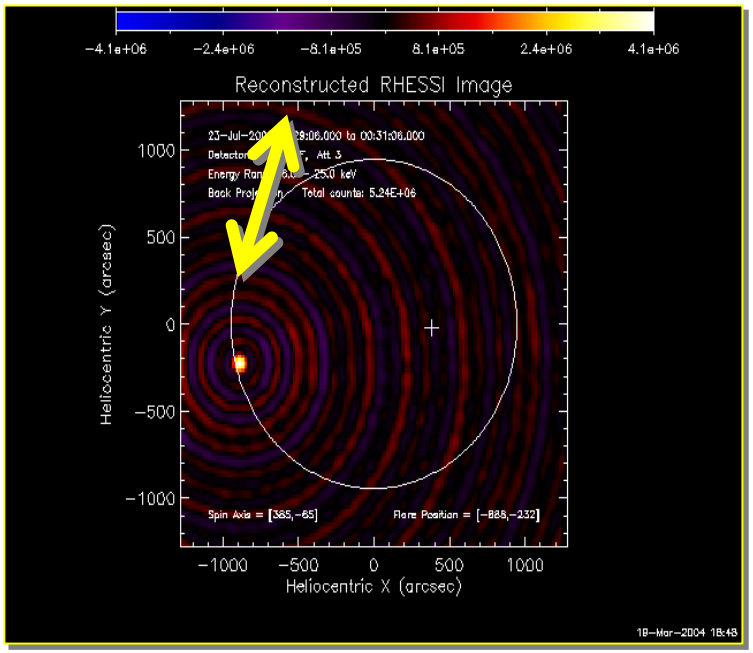
Friday, 10 June, PM

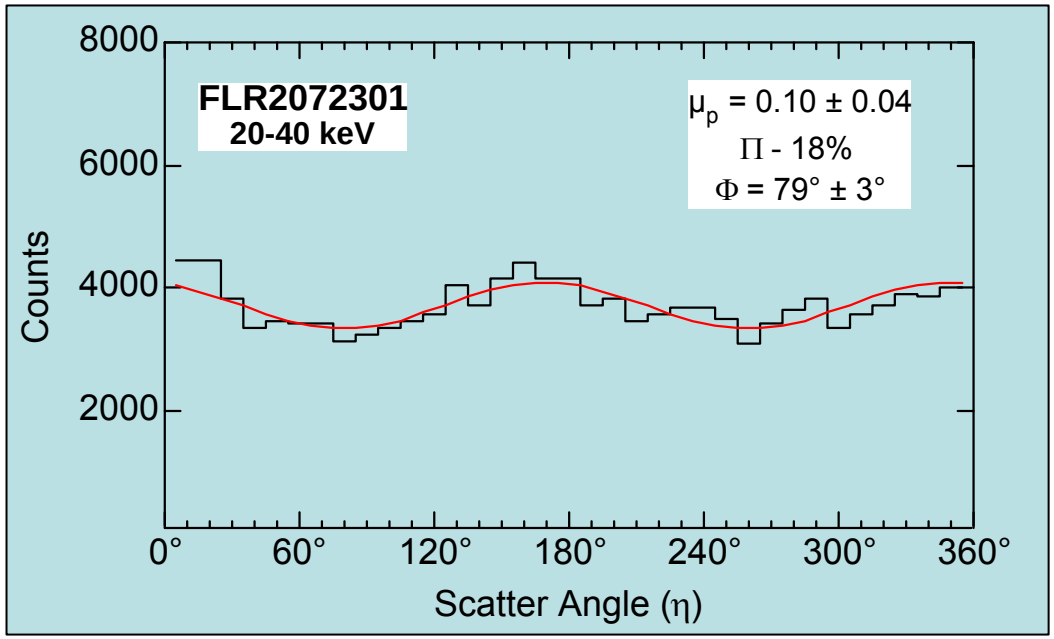
- Status of X-ray polarization results
- Brief discussion of “cataloging” observational results that impact models

Hard X-Ray Polarimetry

X4.8 Flare of 23-July-2002







20 - 40 keV Polarization

Mark McConnell, UNH