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# HETG - Status

*Chandra* Quarterly Review No. 40  
24 September 2015



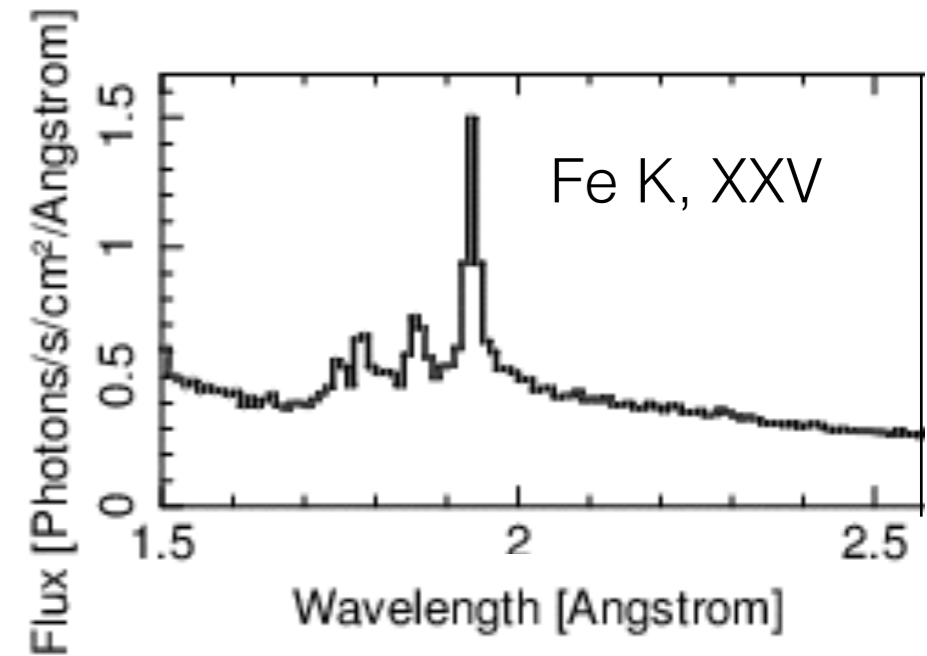
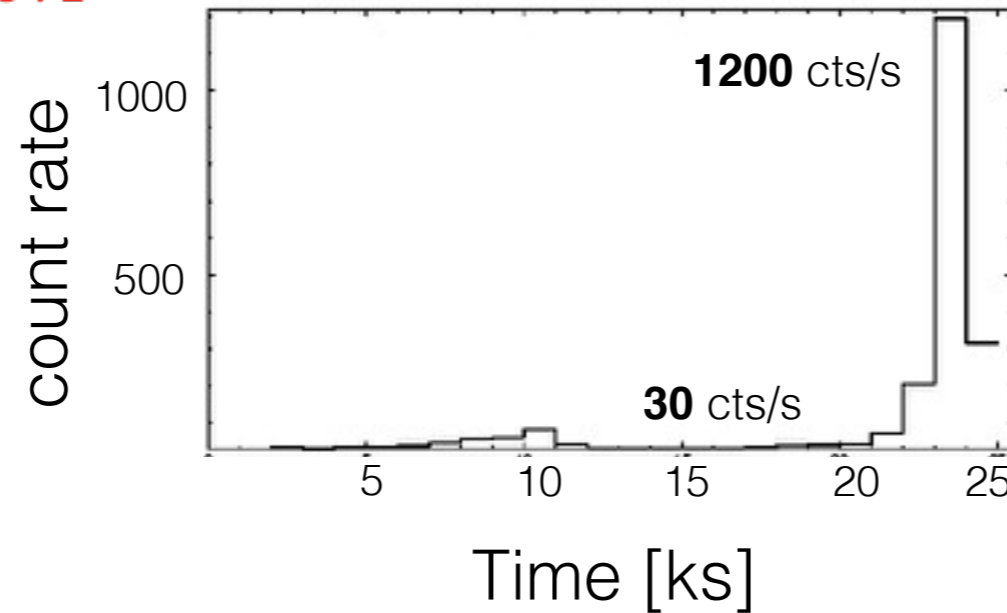
David Huenemoerder  
dph@space.mit.edu

HETG IPI: Prof. C.R. Canizares  
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# Ongoing HETG Team Activities Summary

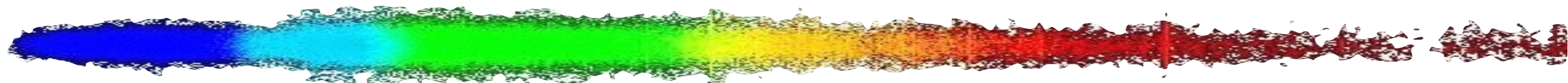


V 404 Cyg outburst  
(CC-mode;  
obs 17697)



- HETG Performance (April 2015 - August 2015)
  - 29 HETG science observations on 12 targets (28/1 GO/GTO)
  - 3 HETG Cal observations, 2 targets
  - Monitoring: width of streak (for focus check)
- LETG GO/GTO Usage: 2 observations on 1 target
- LETG Cal: 5 observations, 2 targets (2 ACIS-S, 3 HRC-S)
  - Contamination (“big dither”)

Grating performance is nominal.



# Ongoing HETG Team Activities



## GTO Science Program

### Cycle 16:

- Hot star:  $\tau$  CMa 285 ks (complete) (O9 II; stellar winds)
- XRB: Ser X-1 135 ks (complete) (Si K edge study)
- AGN: PDS 456 150 ks (complete) (QSO, warm absorber)
- XRB: 4U 1626-67 50 ks (**pending**) (ultra-compact LMXB pulsar)
- XRB: 4U 0513-40 150 ks (**pending**) (ultra-compact object)
- NS: Terzan 5 X-2 200 ks (**untriggered** TOO) (Neutron star)

### Cycle 17: 2 TOO proposals competed; majority of GTO plan deferred to post-peer review

- Hot star + NS: Vela X-1 180 ks clumpy winds; phase 0.15 — 0.45
- XRB: SMC X-1 100 ks TOO, pulsar, high state, emis/abs lines
- AGN: NGC 3227 150 ks Seyfert; warm absorber, soft excess
- NS: Terzan 5 X-2 20 ks TOO; NS EOS
- Hot Star: WR 25 90 ks colliding winds, near periastron
- LMXB: GX 3+1 130 ks resolve broad lines

### Postdoc status/activities:

Victoria Grinberg — since Dec, 2013; Lia Corrales — since July, 2014

- Organized and ran a successful splinter session on spectral analysis with ISIS, in conjunction with the *Chandra* High-Resolution Workshop in August.



# MARX (The HETG Calibration Model, among other uses...)



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← → ↻ 🏠 [space.mit.edu/ASC/MARX/inbrief/news.html#marx-5-1](http://space.mit.edu/ASC/MARX/inbrief/news.html#marx-5-1)

MARX 5.1 documentation » MARX in brief »

## Highlights for each version of marx


### Marx 5.1

**marx** version 5.1 is a maintenance release. Since more than two years have gone by, there have been major changes in the Chandra calibration data that **marx** uses, particularly in the SAOSAC Color Rays. In addition there are several minor changes, some of which are listed below (for complete details):

- **marx** now compiles with `clang`, the compiler that is shipped with Mac OS X (gcc, but this really points to clang.)
- Enhanced support for dithered SAOTrace rays on input. In particular, the SAOSAC\_Color\_Rays is no longer needed. Setting it currently has no effect and will be removed in the next version.
- `marx2fits` writes more header keywords to the output fits files, which enables more flight-like data, Mac build fixes, calibration files updated.
- The HRC blur model has been improved. In order to describe the HRC blur properly, new parameters have been added. These parameters should not be changed by the user. Instead we strongly recommend to just copy and modify the version of `marx.par` that comes with the installation which includes those updated values.

Previous topic  
MARX in brief

Next topic  
Downloading and Installing Marx

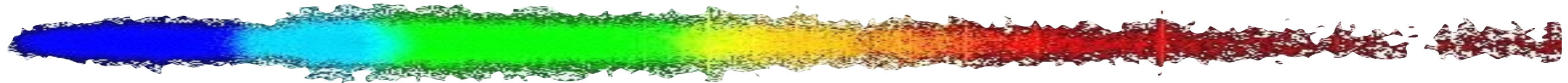


CXC@MIT



Dr. Moritz Günther : MARX support & maintenance.

Major overhaul is done — documentation updates, more header keywords for more flight-like data, Mac build fixes, calibration files updated.





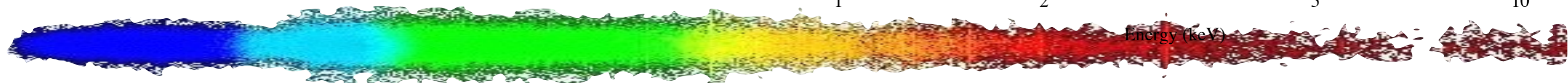
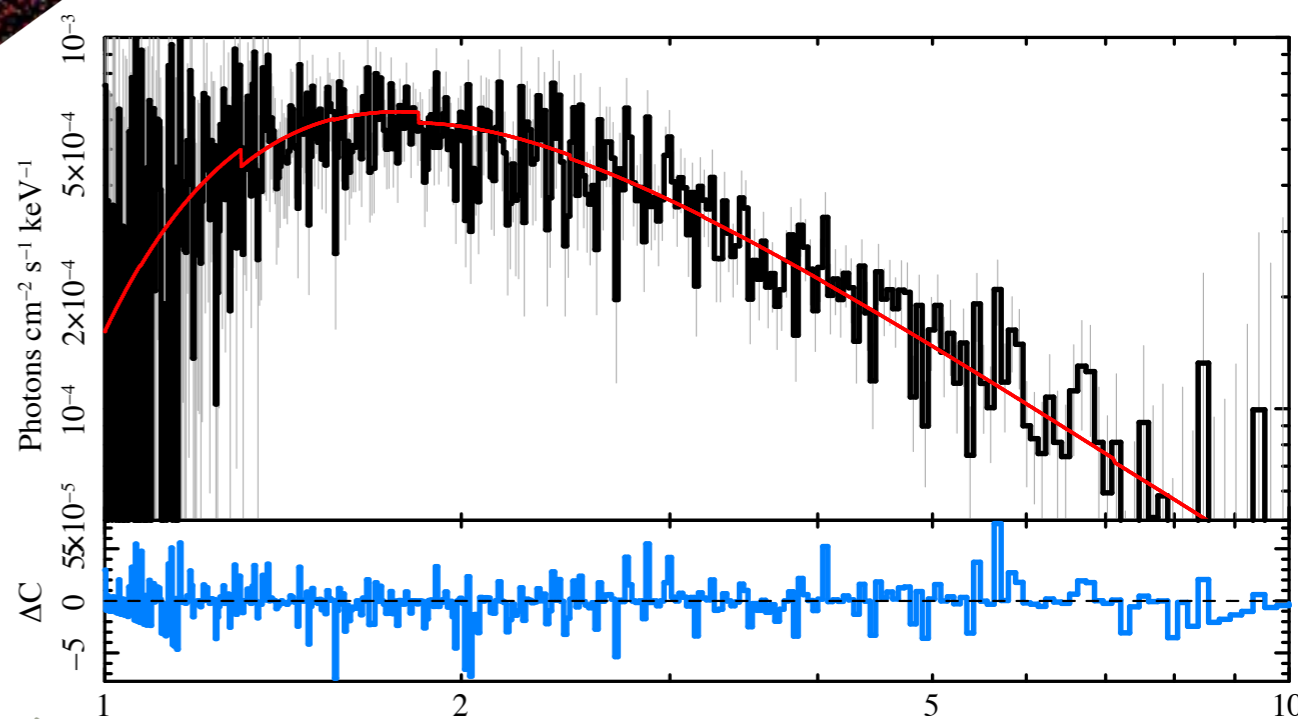
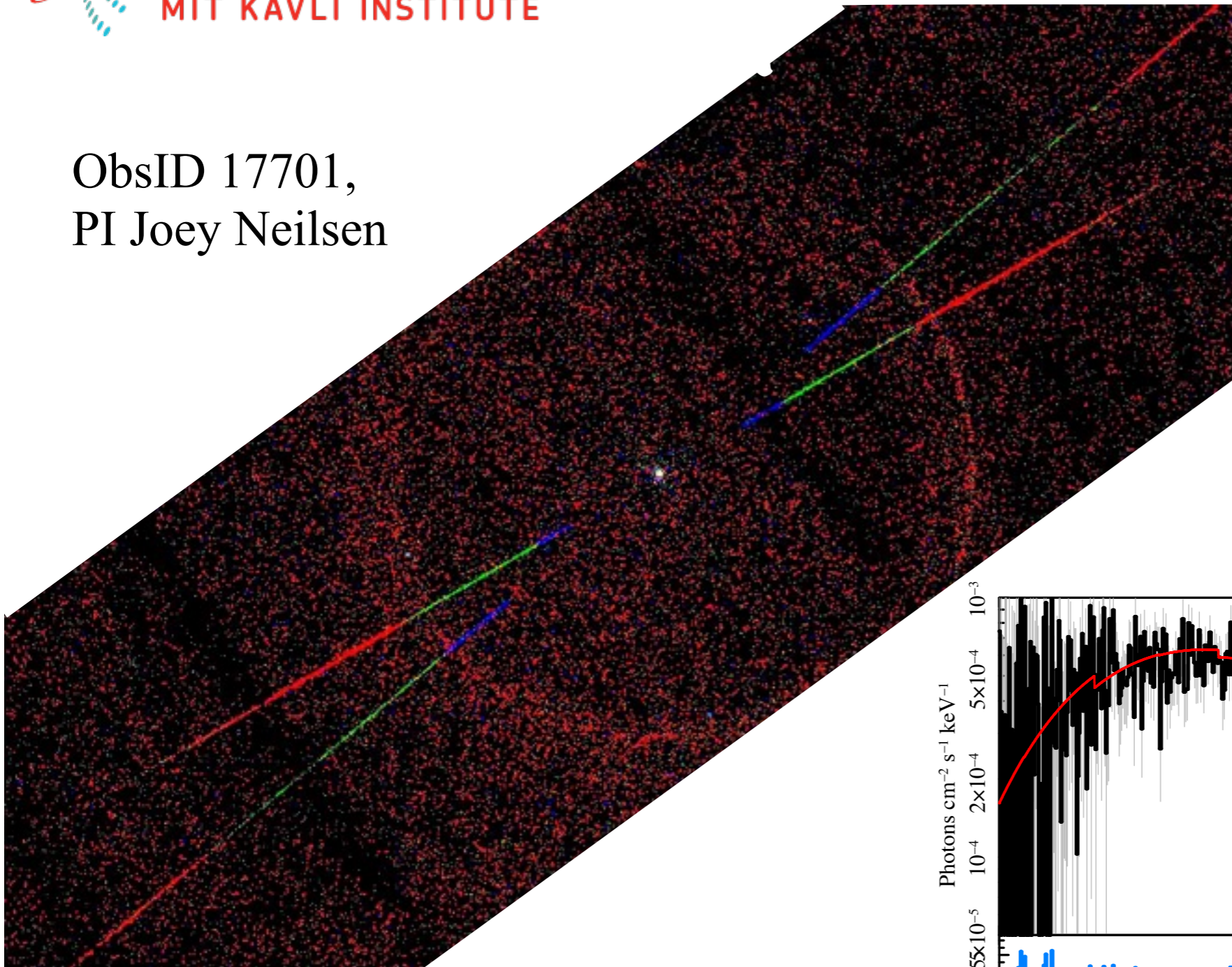
# HETG Science: V404 Cyg



ObsID 17701,  
PI Joey Neilsen

High mass X-ray binary,  
black hole plus G-star; nova,  
transient.

Outburst in June 2015, after  
25 years in quiescence.  
Extremely variable, factors of  
100—1000 in seconds to  
hours, radio to X-ray.





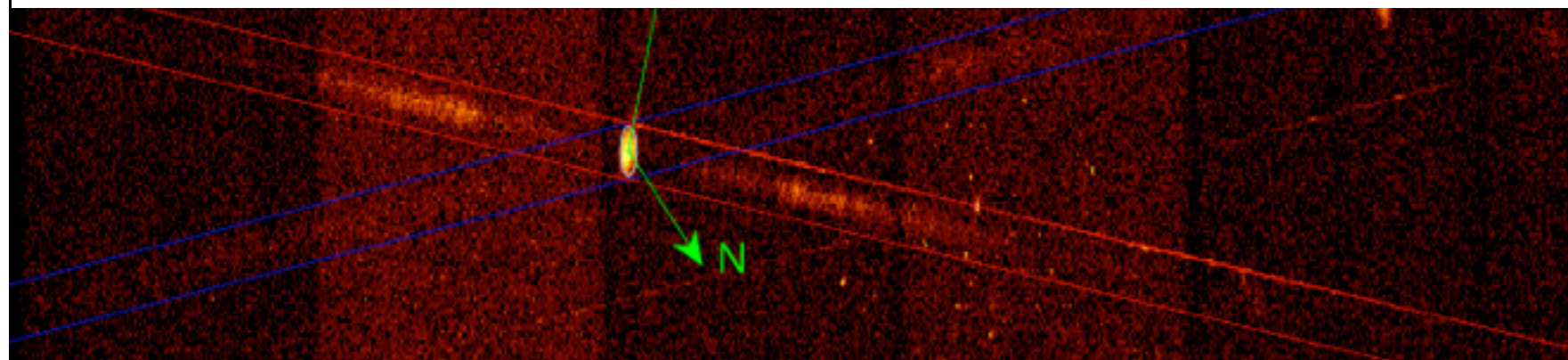


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# GTO Cycle 17 Science: *Colliding Winds in WR 25...*

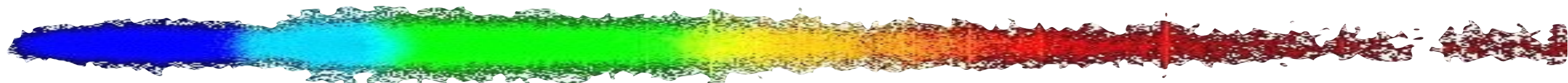
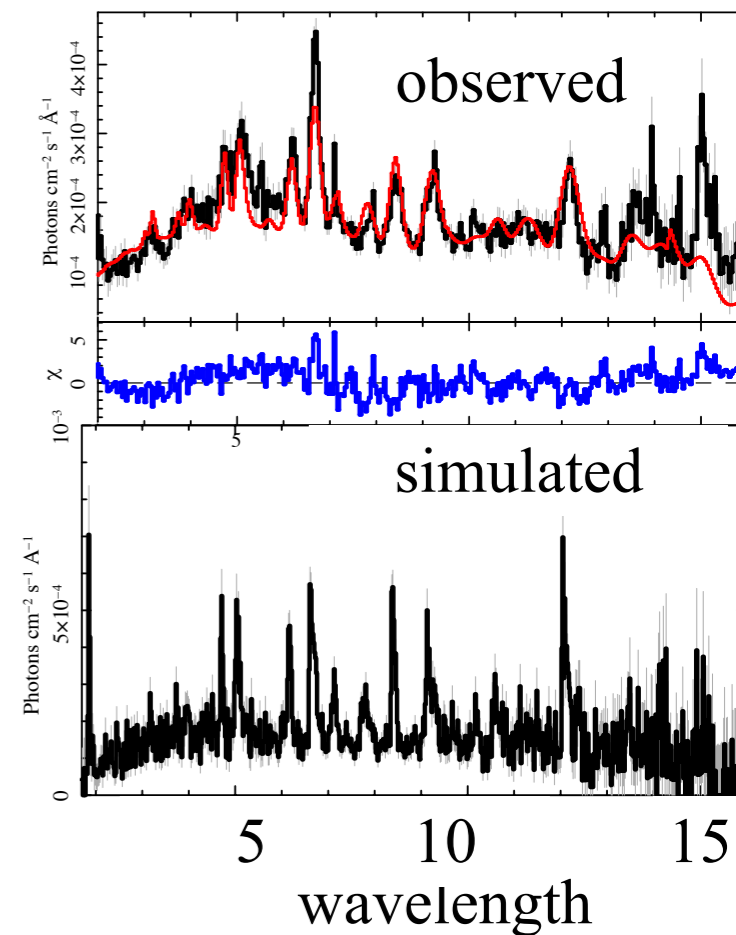
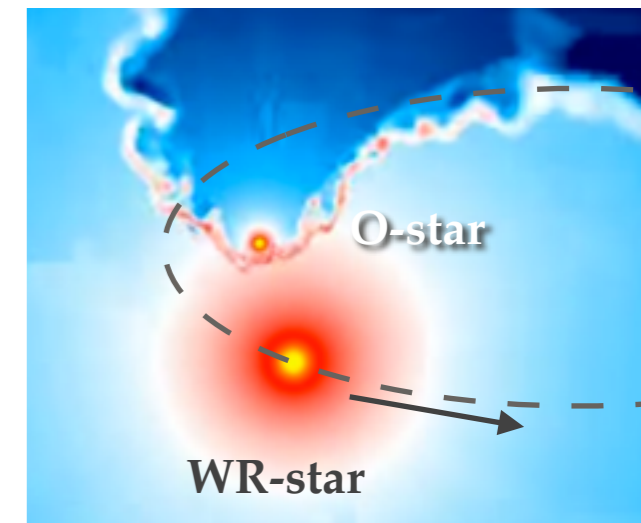
... or, *Using serendipity in TGCat to plan observations.*

WR 25 was observed 10 times w/ HETG, but *10 arcmin off-axis*



WR 25 is a very bright, eclipsing colliding-wind system (Wolf-Rayet star plus an O-star). Period of 208 days. *No high-res spectra to date!*

**Motivation:** study shock physics — ion, electron temperatures; shock dynamics from line-profiles vs phase; WR-wind structure, from eclipses. More convenient system  $P=208$  d (vs 8 yr for WR 140, 5 yr for  $\eta$  Car).



# HETG Team Activities: Grating/CC-mode Enhancements



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ObsID: 17697 SIM offset: -12.61 CC33\_GRADED v404 Cyg  
ciao 4.7 ciao 4.8

- ❖ `tg_resolve_events` uses order-sorting (HEG or MEG), geometry, and aspect to estimate CHIPY
- ❖ A *second pass* through `acis_process_events` recomputes CHIPY-dependent quantities, ultimately ENERGY
- ❖ A *second pass* through `tg_resolve_events` uses the updated ENERGY to recompute orders.

