

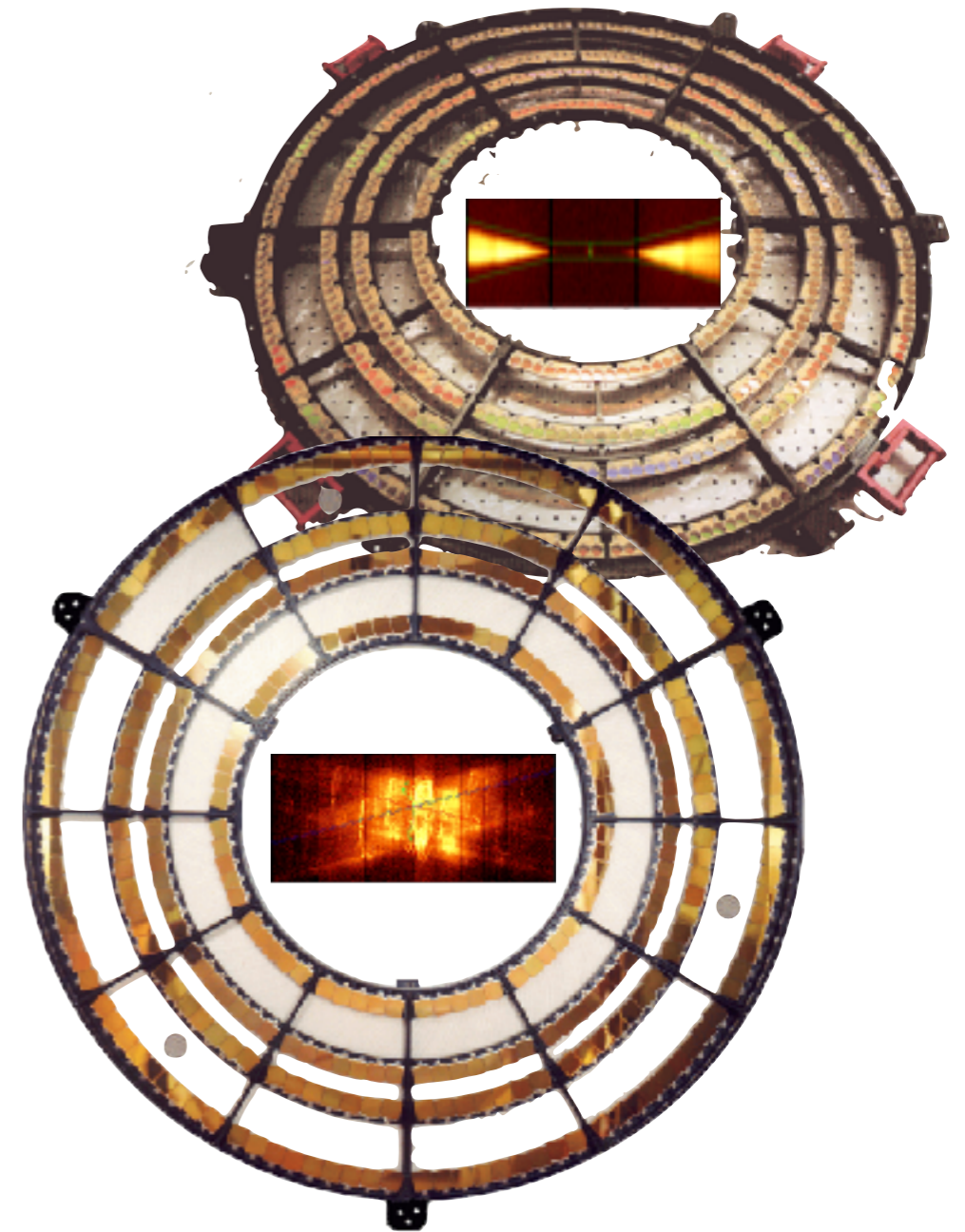


MIT KAVLI INSTITUTE

# H/LETG — Status

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MIT Kavli Institute

# Ongoing HETG Team Activities Summary



**HETG/ACIS-S Performance** (October 2017 — March 2018); 1643 ks

- 53 HETG observations on 8 targets (45/8 GO/GTO observations); Parts of several large programs (Cycle 18-19): 500, 450, 327 ks GO; 480 ks GTO
- 0 HETG Cal observations

**LETG Performance** (October 2017 — March 2018); 961 ks

- 24 LETG/HRC-S observations, 4 targets (22/0/2 GO/GTO/Cal, 792 ks)
- 1 LETG/HRC-I observations (Cal, 2 ks)
- 7 LETG/ACIS-S observations, 1 target (Cal, 167 ks)

*Grating performance is nominal.*

***TGCat*** has 1833 extractions for 476 objects (+49/+7 since last report)

Total volume: 417 GB

Downloads: 255 packages, 74 GB

3151 single file, 1.2 GB

<http://tgcat.mit.edu>

## GTO Science Program, HETG/ACIS-S

### Cycle 18:

- |                        |        |   |
|------------------------|--------|---|
| ★ ULX/BH: NGC 1313 X-1 | 481 ks | Ultra-luminous source outflow: absorption, emission lines |
| ★ NS/BH: GRS 1915+105  | 97 ks  | Black hole accretion, line variability                    |
| ★ XRB: 4U 1626-67      | 45 ks  | Neutron star accretion; Fe K absorption variability       |

### Cycle 19:

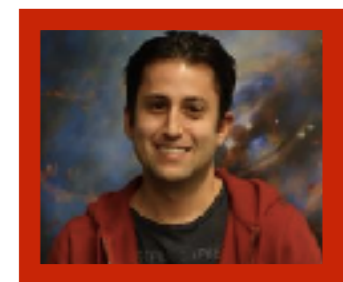
- |                           |          |  |
|---------------------------|----------|--|
| ★ <b>AGN:</b> Fairall 51  | 0/240 ks | Seyfert 1, warm absorber variability (w/ NuSTAR 120 ks)          |
| ★ <b>HMXB:</b> 4U 1907+09 | 0/145 ks | Accreting neutron star; wind emission, absorption lines          |
| ★ <b>Stars:</b> V773 Tau  | 0/140 ks | Evolution of pre-MS stars; flares (w/ NuSTAR 150 ks)             |
| ★ Stars: TW Hya           | 0/55 ks  | Accretion/winds in pre-main-sequence stars ( <i>HETG/HRC-I</i> ) |
| ★ ISM: 4U 1636-53         | 0/140 ks | Si, Fe absorption edges; part of survey vs $N_H$                 |
| ★ NS: Terzan 5 X-2        | 0/200 ks | TOO (10%); Neutron Star Equation of State                        |
| ★ LIGO/GW: GW2018nnnn     | 0/300 ks | TOO (10%); Gravitational wave transient                          |

### Postdoc status/activities:

Dr. Rozenn Boissay, since Feb 2017 (Ph.D. U. Geneva, May 2016)

Dr. Paul Hemphill, since Oct 2016 (Ph.D. UCSD, August 2016) [partial GTO support]

Dr. David Principe, since Nov 2016 (GO supported; involved in HETG/GTO program)





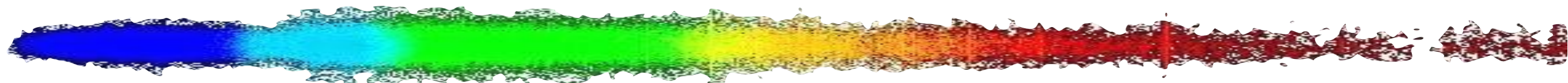
## LETG/GTO Science Program

### Cycle 18:

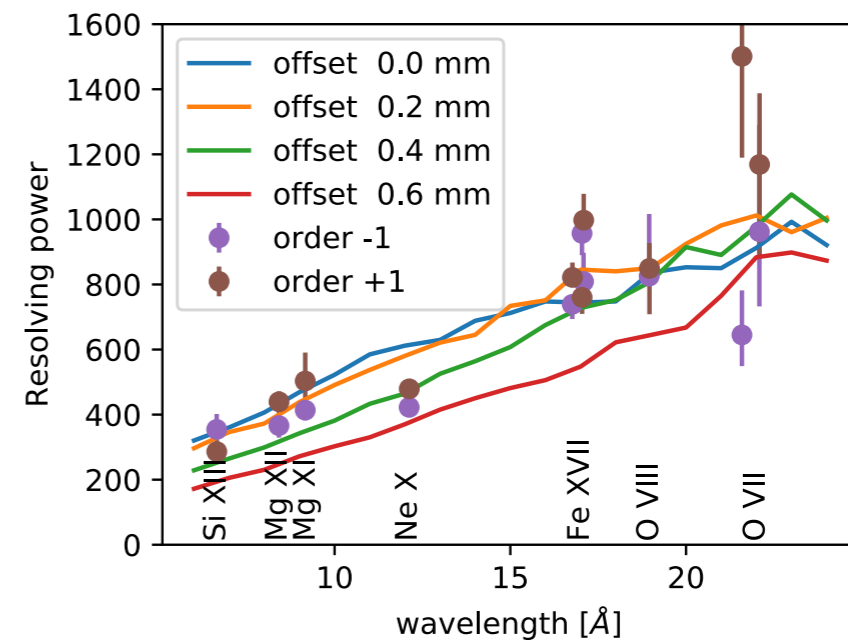
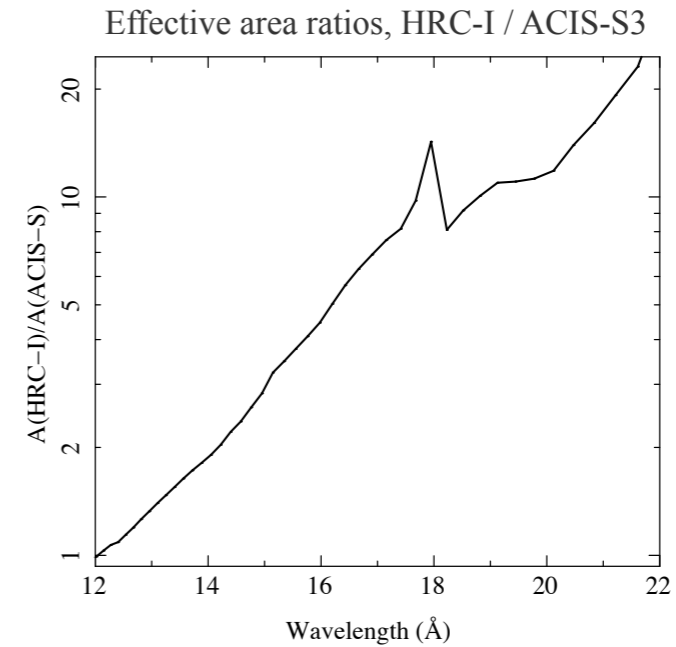
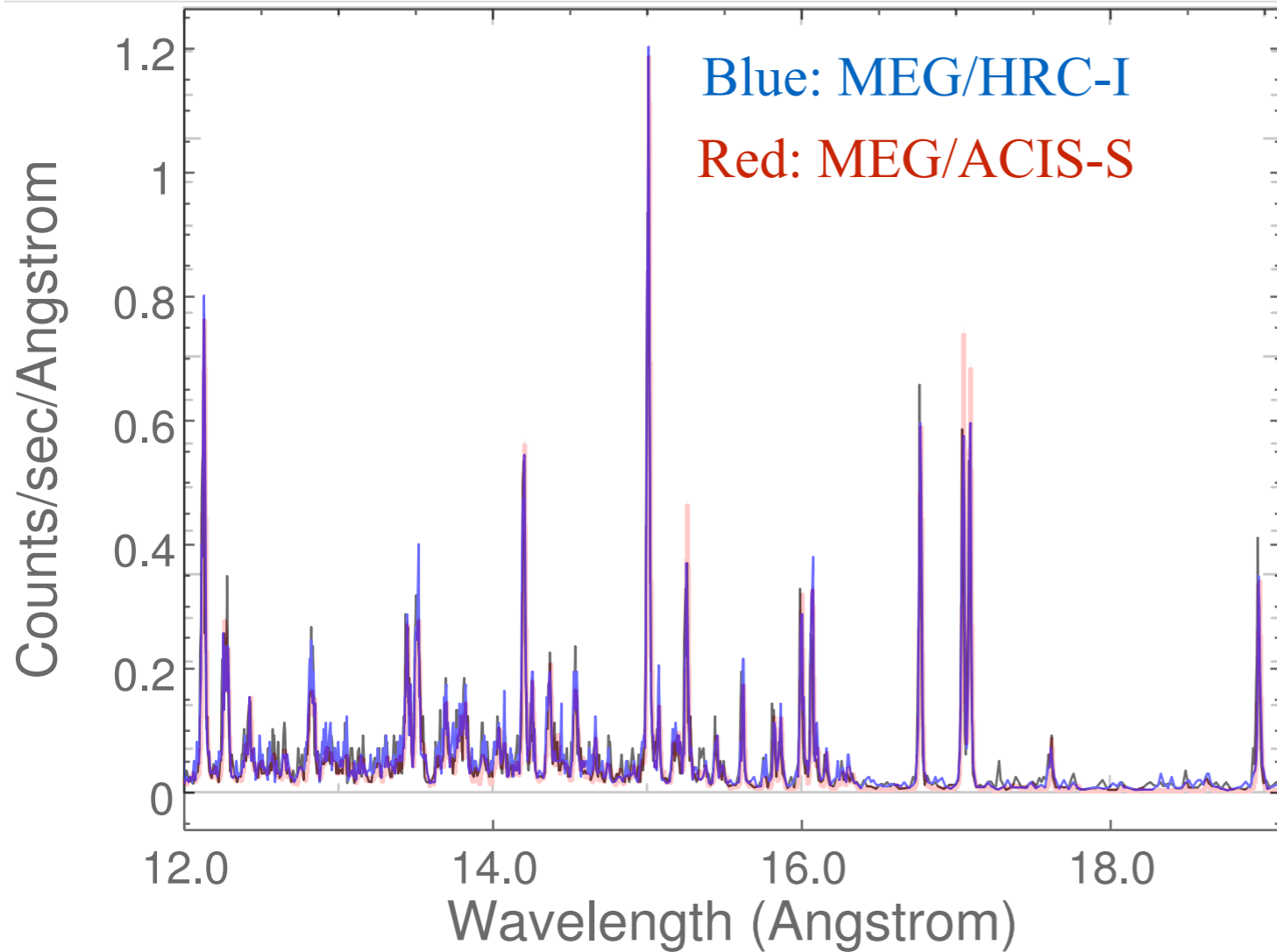
- ★ AGN: (Kaastra/SRON) IC 4329a 174 ks Neutral, warm absorbers (HETG/ACIS-S) (Mehdipour, Costantini et al. 2018, in preparation)
- ★ Stars: (Predehl/MPE) Proxima Cen 166 ks Reference spectrum of an old M-dwarf (LETG/HRC)

### Cycle 19:

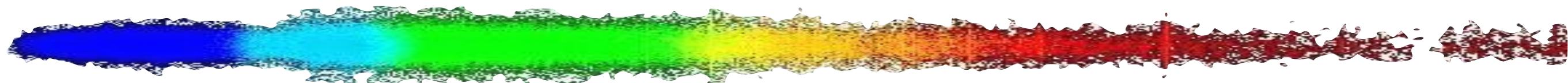
- ★ NS: (Predehl/MPE) RX J2143.0+0654 0/175 ks Cyclotron Absorption Line in an Isolated Neutron Star (LETG/HRC)
- ★ Gal: (Kaastra/SRON) 1E 2216/1E 2215 0/145 ks Shocks in Galaxy Cluster Collisions (ACIS-I)
- ★ ISM: (Kaastra/SRON) 4U 1608-522 0/30 ks Astro-silicates through Mg and Si K-edges (HETG/ACIS)



# HETG Calibration / Analysis: Experimenting with a new setup: HETG/HRC-I



(For details, see the 2018 *Chandra* Newsletter HETG article.)



# HETG Science: Active Galactic Nuclei

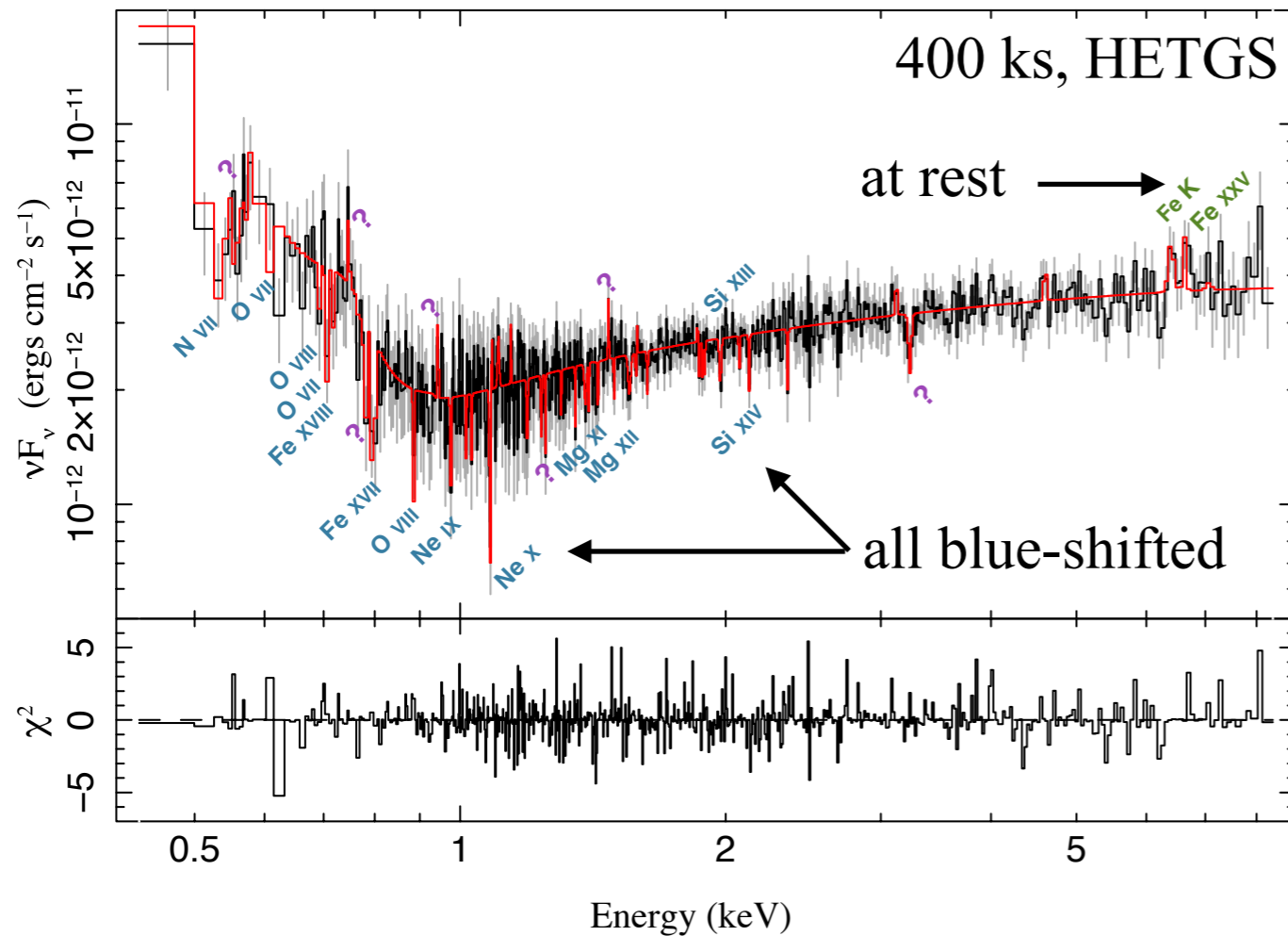


[2018ApJ...853..165D](#)

## *The Ultra-Fast Outflow of the Quasar PG 1211+143 as Viewed by Time-Averaged Chandra Grating Spectroscopy*

A. Danehkar, M.A. Nowak, J.C. Lee, G.A. Kriss, A.J. Young, M.J. Hardcastle, S. Chakravorty, T. Fang, J. Neilsen, F. Rahoui, R. K. Smith

*“... Crucial to this discovery were spectrometers with velocity resolutions well-matched to the width of the absorption lines. Verifying these results, searching for the additional absorption systems suggested by the XMM-Newton spectra, ... will either require significantly longer Chandra/HETGS spectra, or a high resolution X-ray spectrometer with significantly higher effective area. ...”*



*Our simultaneous Chandra and HST observations are the first definitive confirmation of an ultra-fast outflow detected simultaneously in both X-ray and UV spectra. Highly ionized gas at an outflow velocity of  $-17\,300\text{ km s}^{-1}$  ( $-0.0577c$ ) in our Chandra spectrum*

**HETG/GTO Work in progress:** We have just completed (Feb. 2018) 500 ks on the Ultra Luminous X-ray source NGC 1313 X-1, to search for a similar Ultra Fast Outflow (UFO) in its spectrum.