Searches for Absorption Lines in Neutron Star Atmospheres

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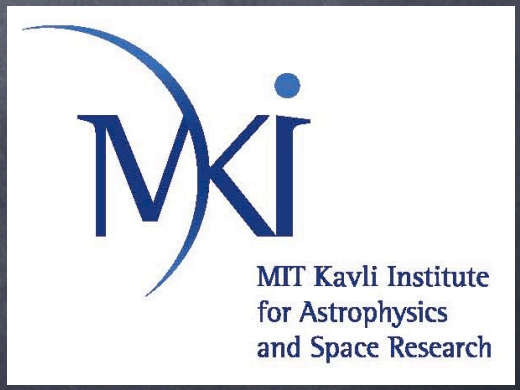
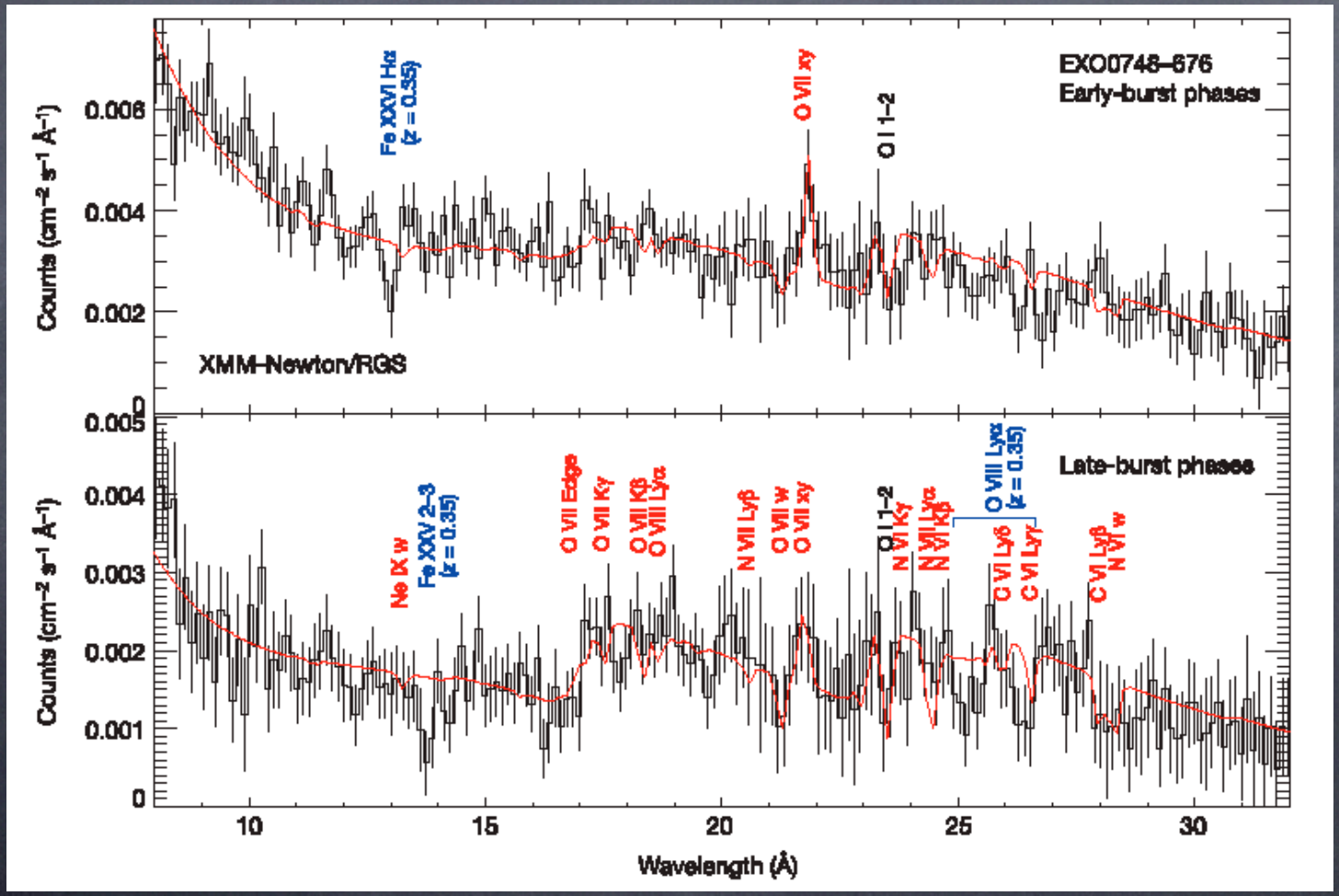


EXO 0748-676

- XMM-Newton RGS, 335 ks, 3200 s in 28 bursts

Cottam et al. 2002



Chandra Grating Results

(a Personal Perspective)

- Accretion to surface: null result for the Rapid Burster type II bursts (Marshall et al. 2001)
- Pulsars: null result for PSR B0656+14 (Marshall & Schulz 2002)
- Isolated neutron stars: null result for RX J1856.5-3754 (Drake et al. 2002)
- Magnetars: null results for 4U0142+61 (Juett et al. 2002) and RX J0720.4-3125 (Kaplan et al. 2003)
- Type I X-ray bursts: null results for GS 1826-283, EXO 0748-676 (unpublished)

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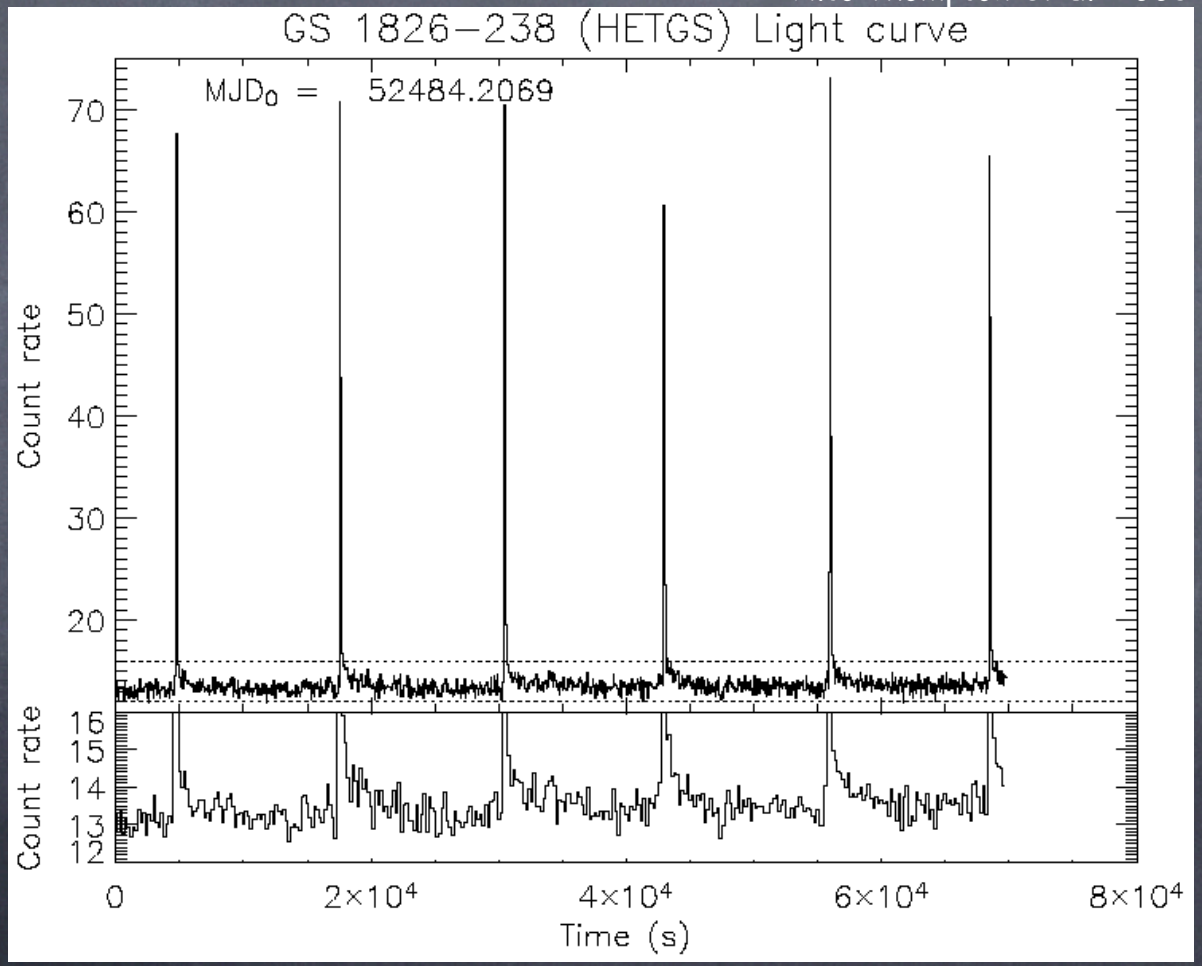
GS 1826-238

- Six bursts in 70 ks

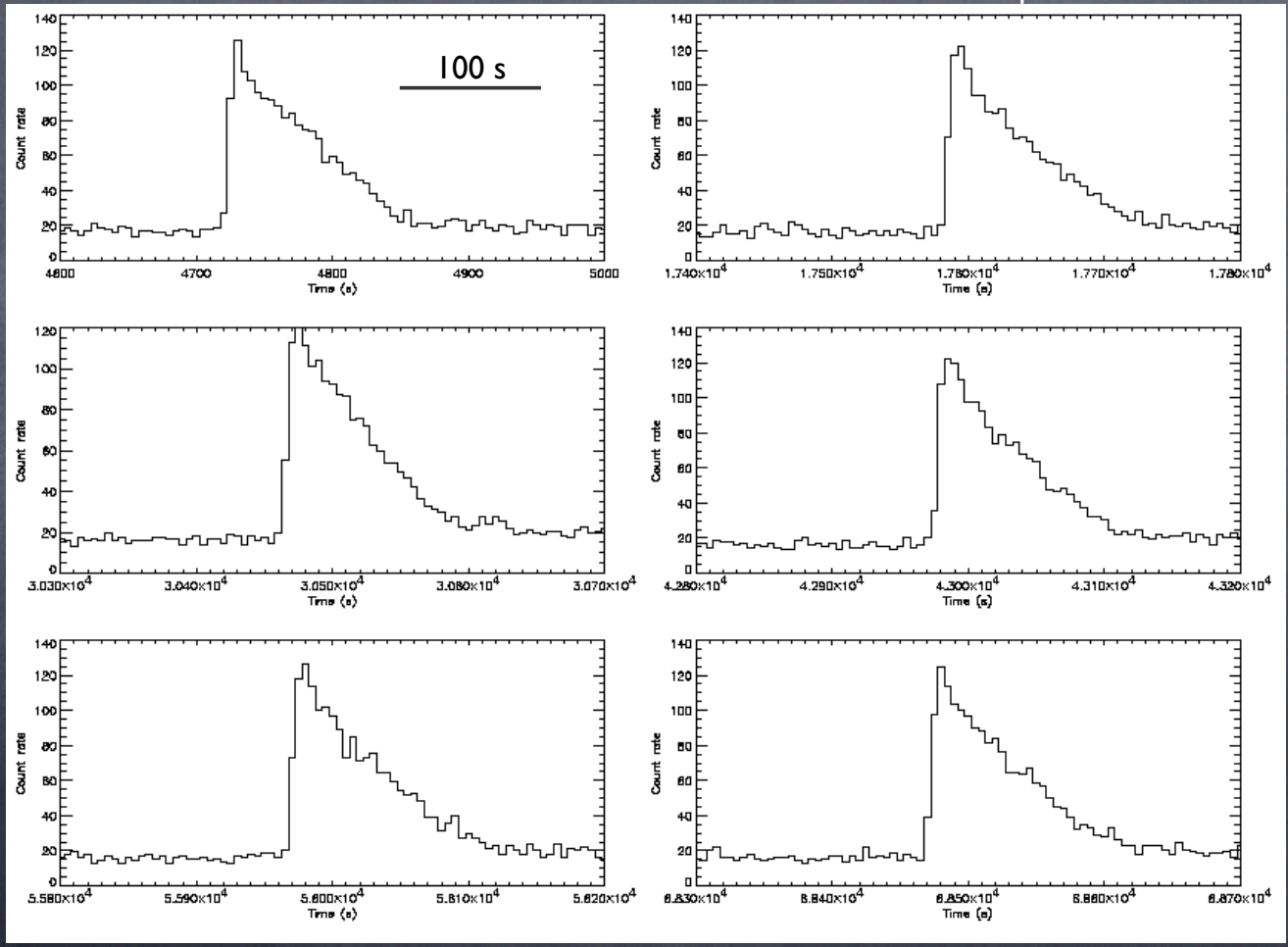
Also Thompson et al. 2005



GS 1826-283 Bursts

- Bursts are remarkably similar, bright
- Split into peak (1st 25 s) and tail (remainder)

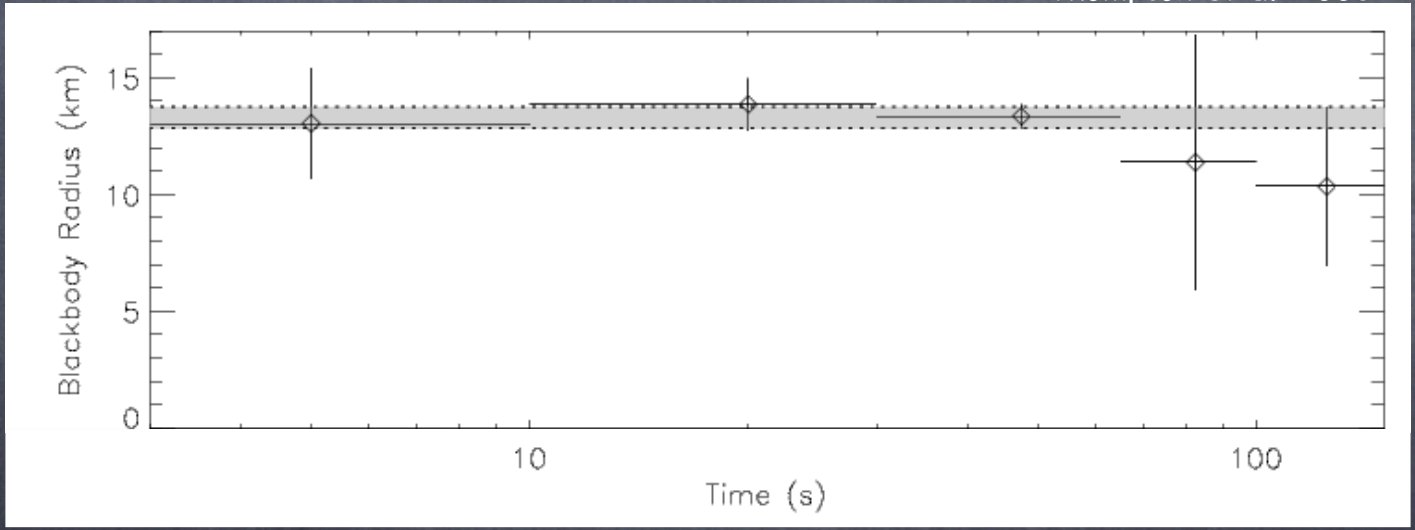
Also Thompson et al. 2005



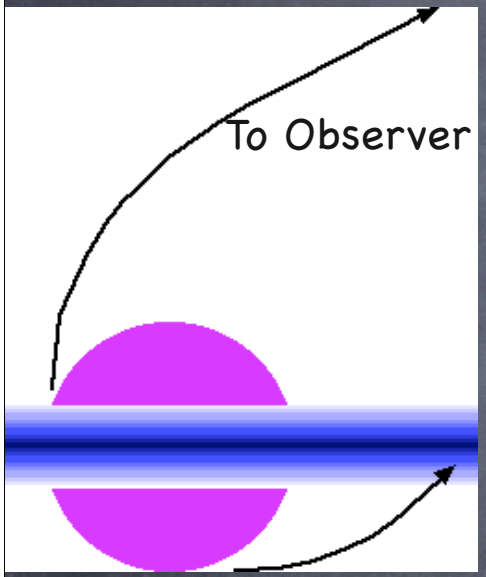
GS 1826-283 Burst Radii

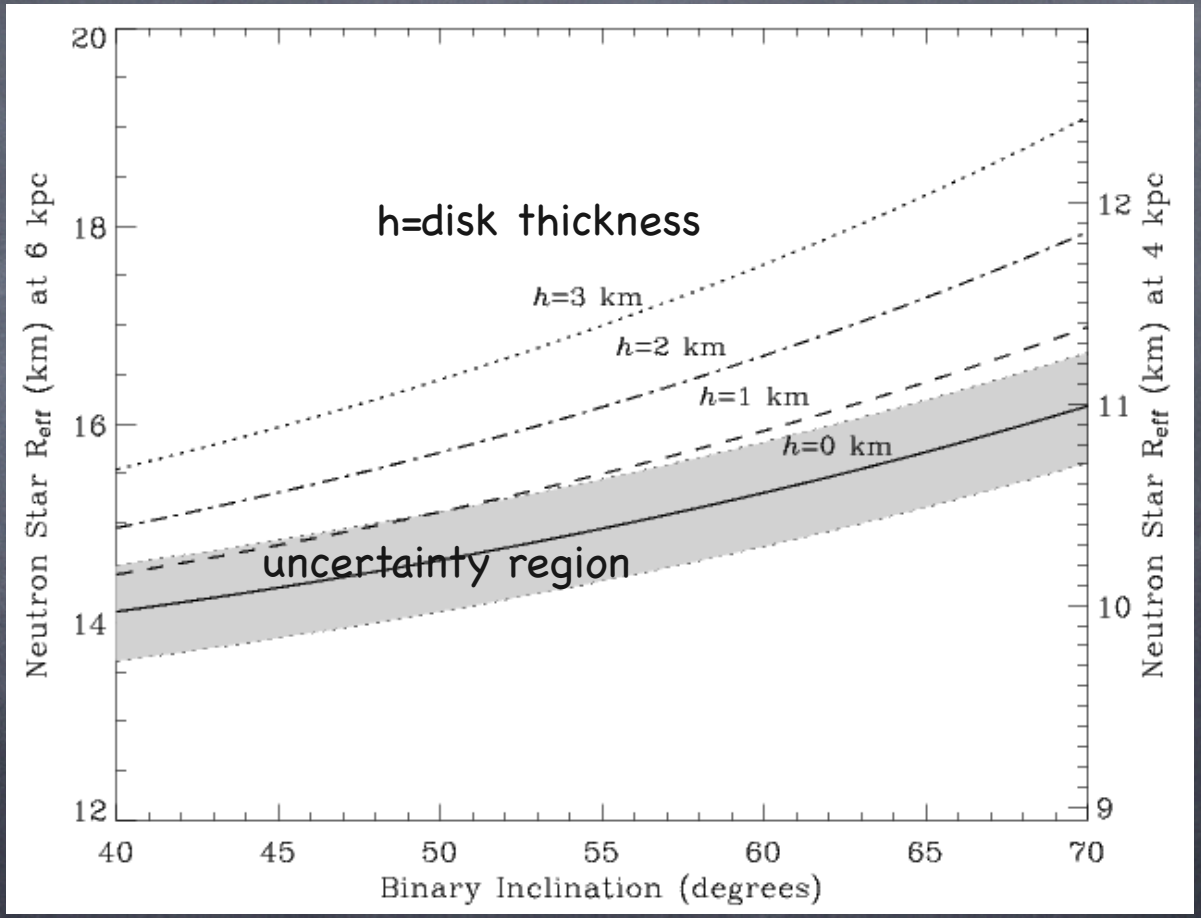
- BB apparent radius is constant during bursts
- R_{app} = 13-14 km for D = 6 kpc

Thompson et al. 2005



Accretion Disk Blocks the Hot Surface

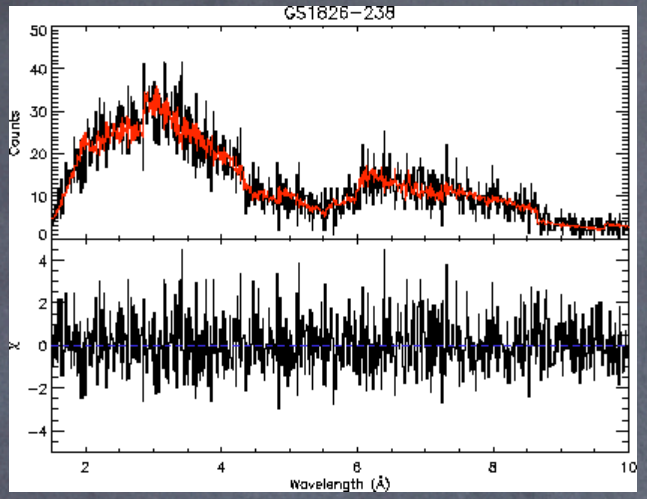


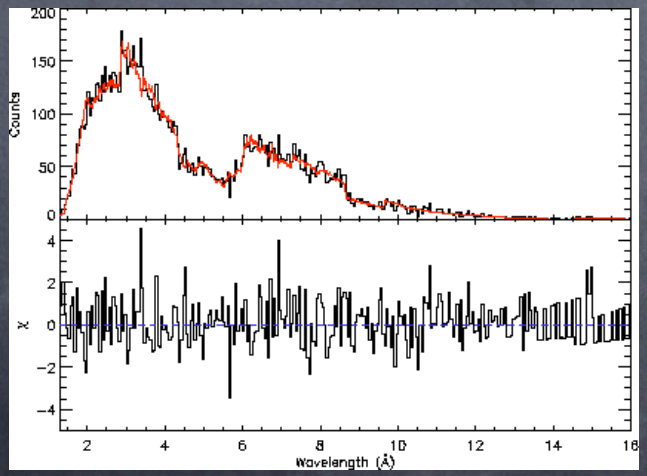


Thompson et al. 2005

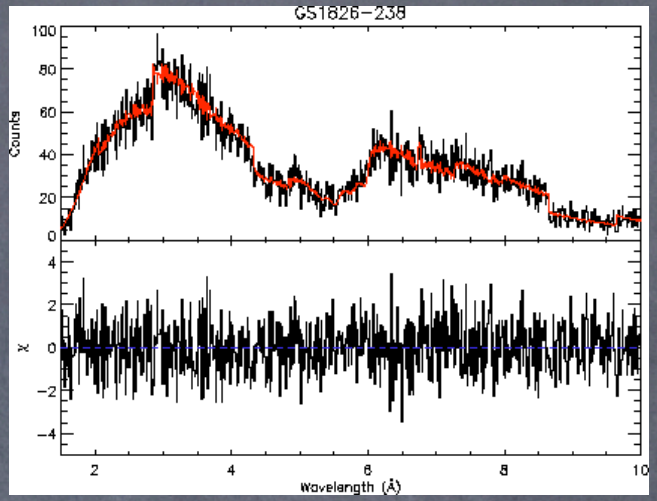
GS 1826-238 Burst Spectra

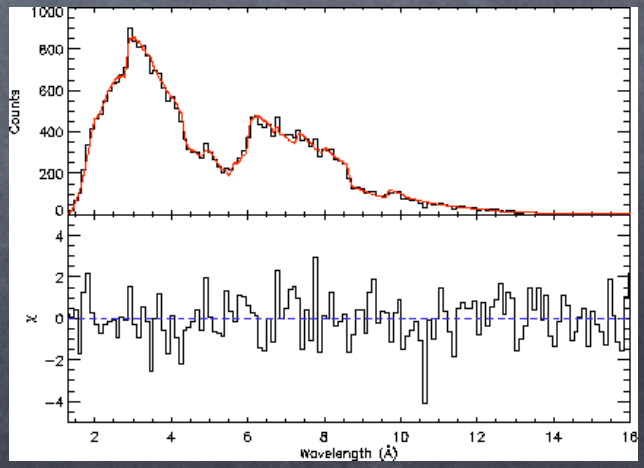
Peaks (kT = 2.04 keV)





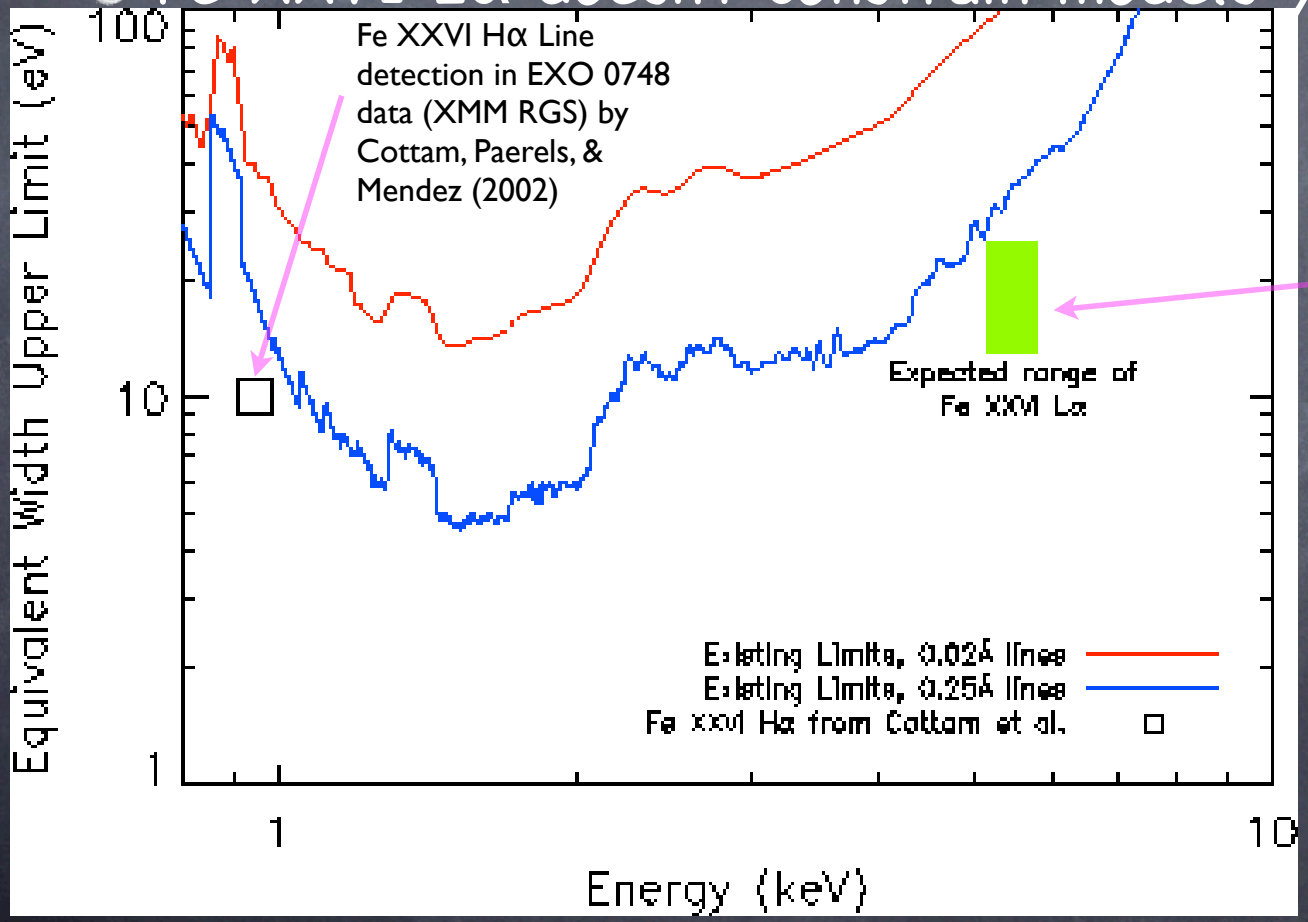
Tails (kT = 1.58 keV)





Burst Peak Results

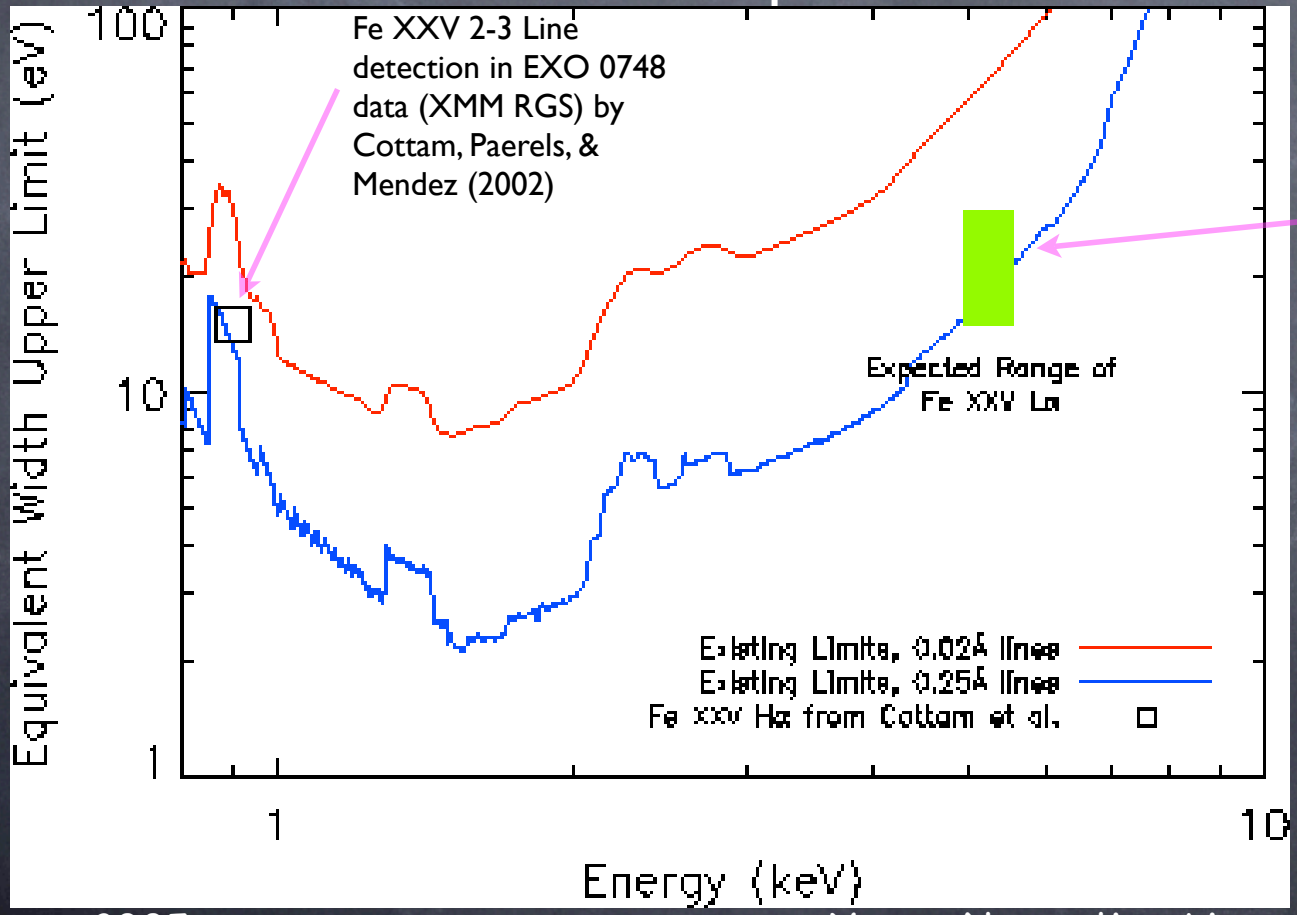
- Fe XXV Hα limit is not as good as in EXO 0748 XMM data (Cottam et al. 2002)
- Fe XXVI Lα doesn't constrain models yet



Fe XXVI Lα estimate (Bildsten, Chang & Paerels 2003)

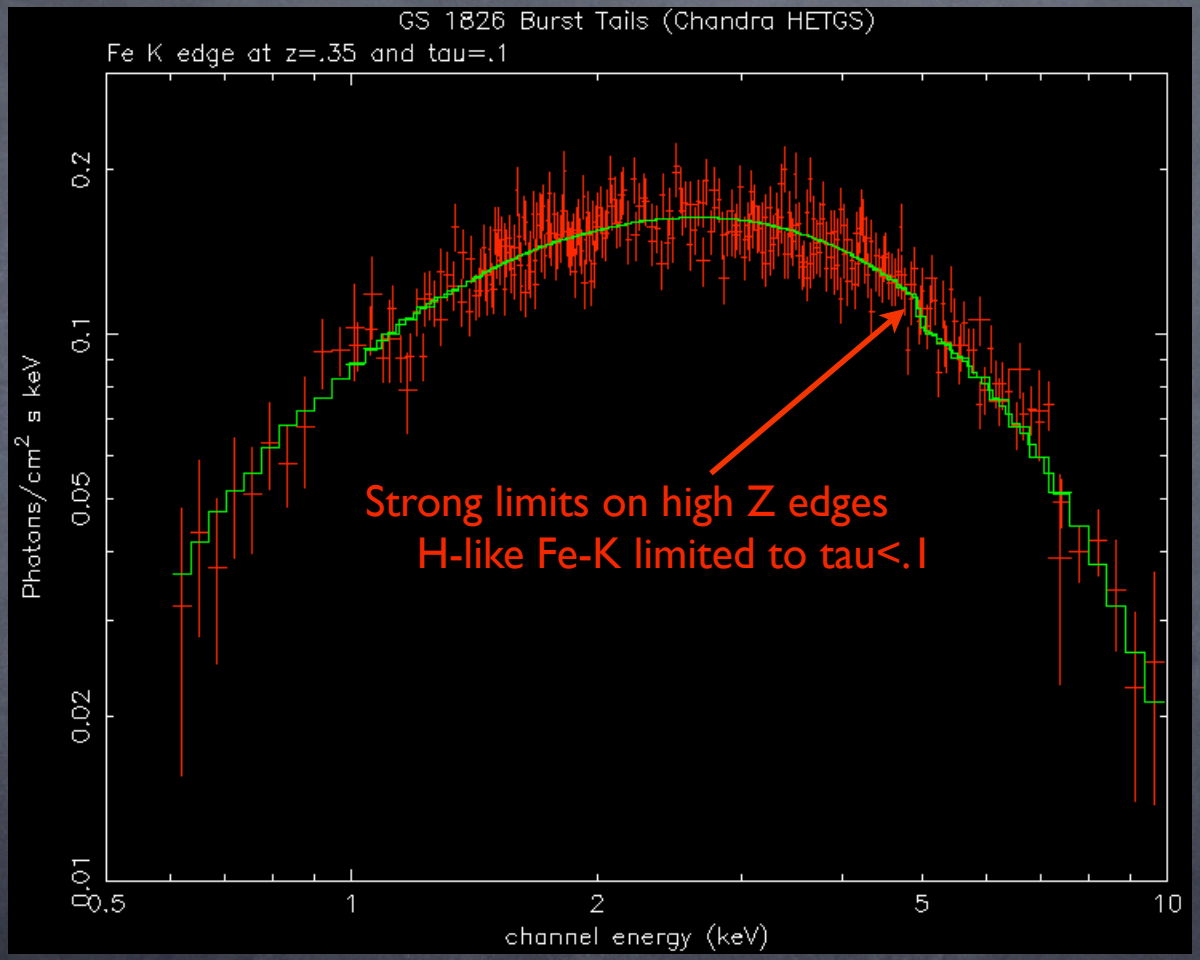
GS1826 Burst Tail Results

- Fe XXV n=2-3 limit is consistent with RGS results on EXO 0748: >5 Hz rotation rate
- Fe XXV Heα limit requires rotation > 30 Hz



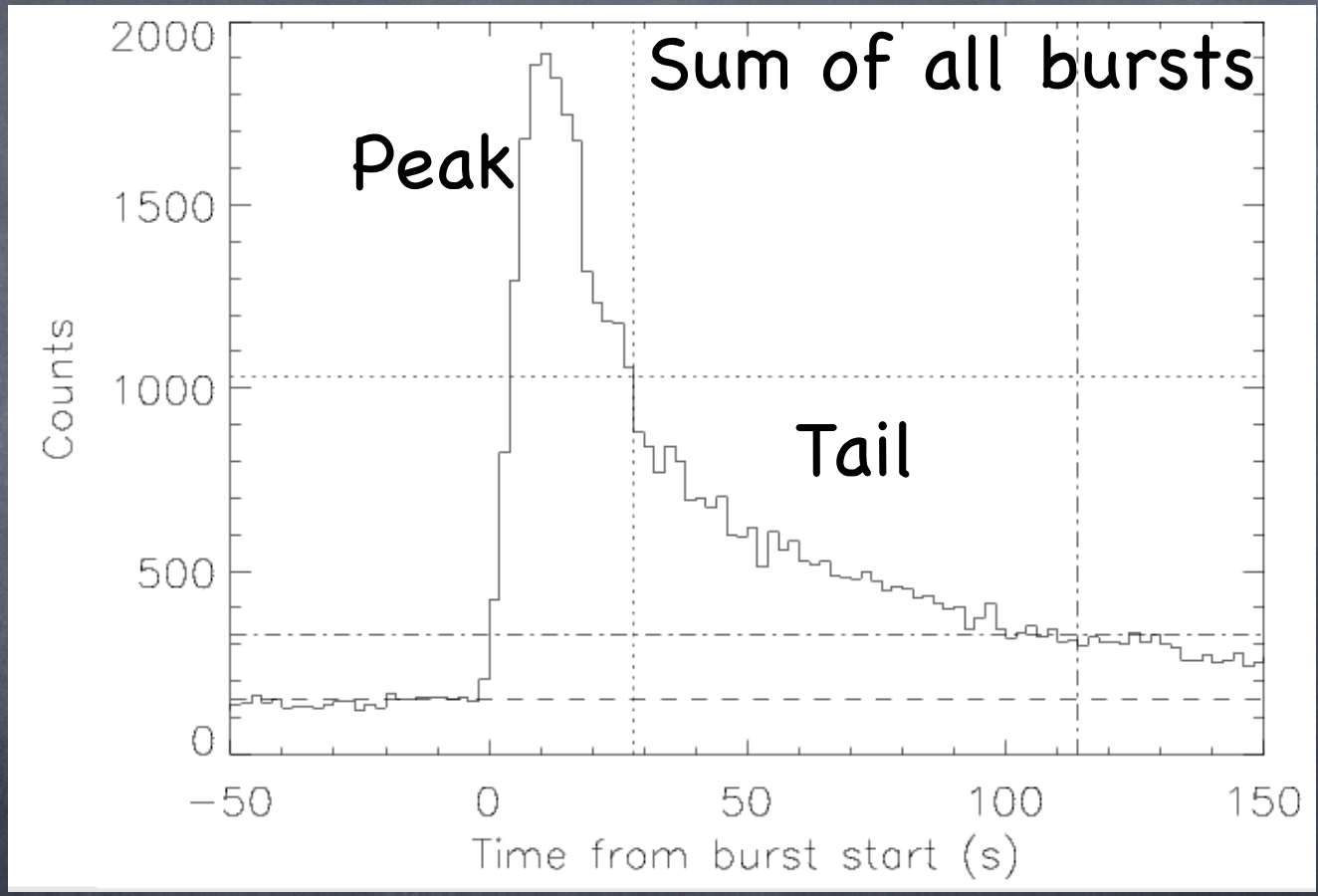
Fe XXV Heα prediction (Foster, Fabian & Ross 1987)

GS1826-238 Edges

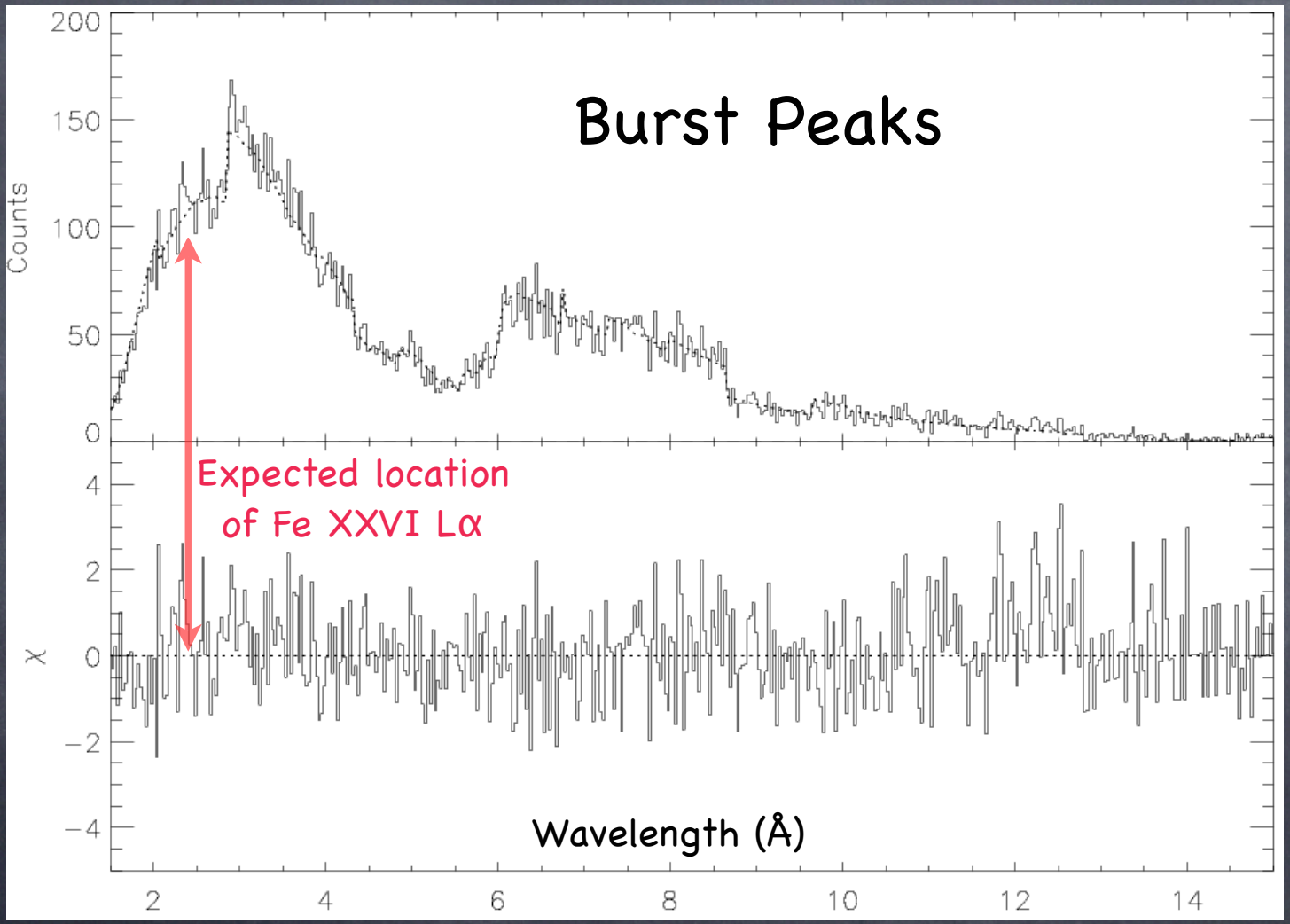


Recent HETGS Data on EXO 0748-676

- 37 bursts in 300 ks



Spectra of EXO 0748-676



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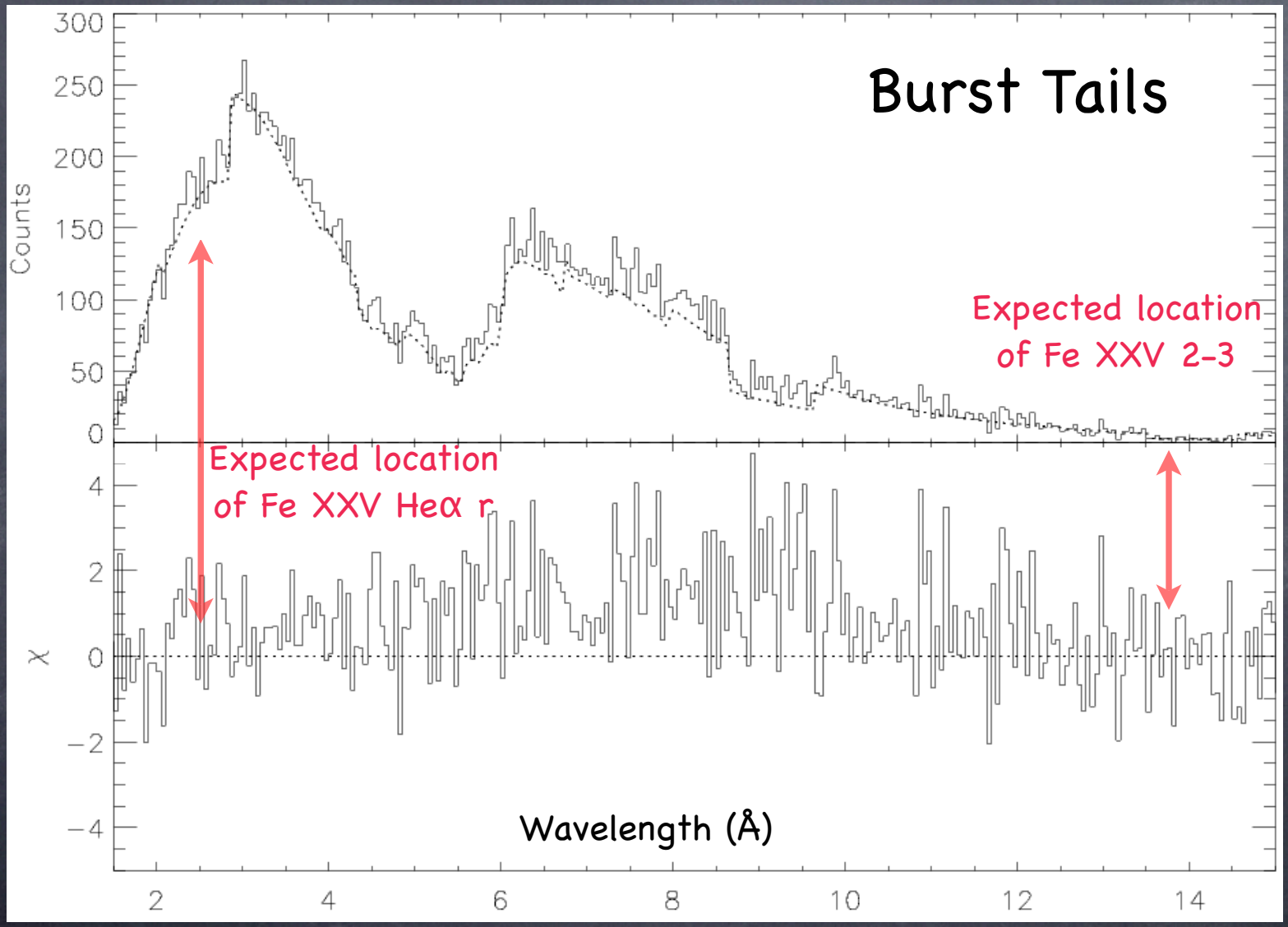
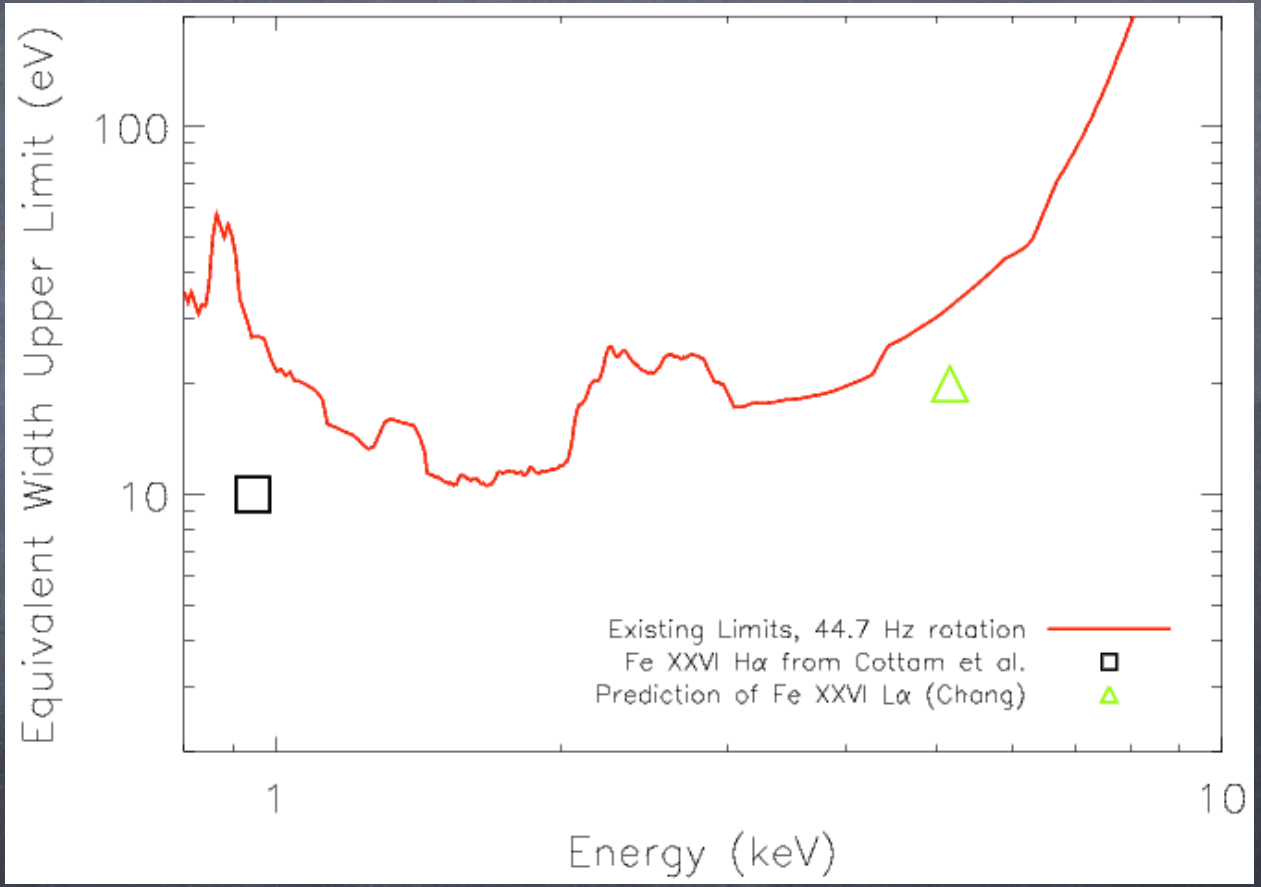


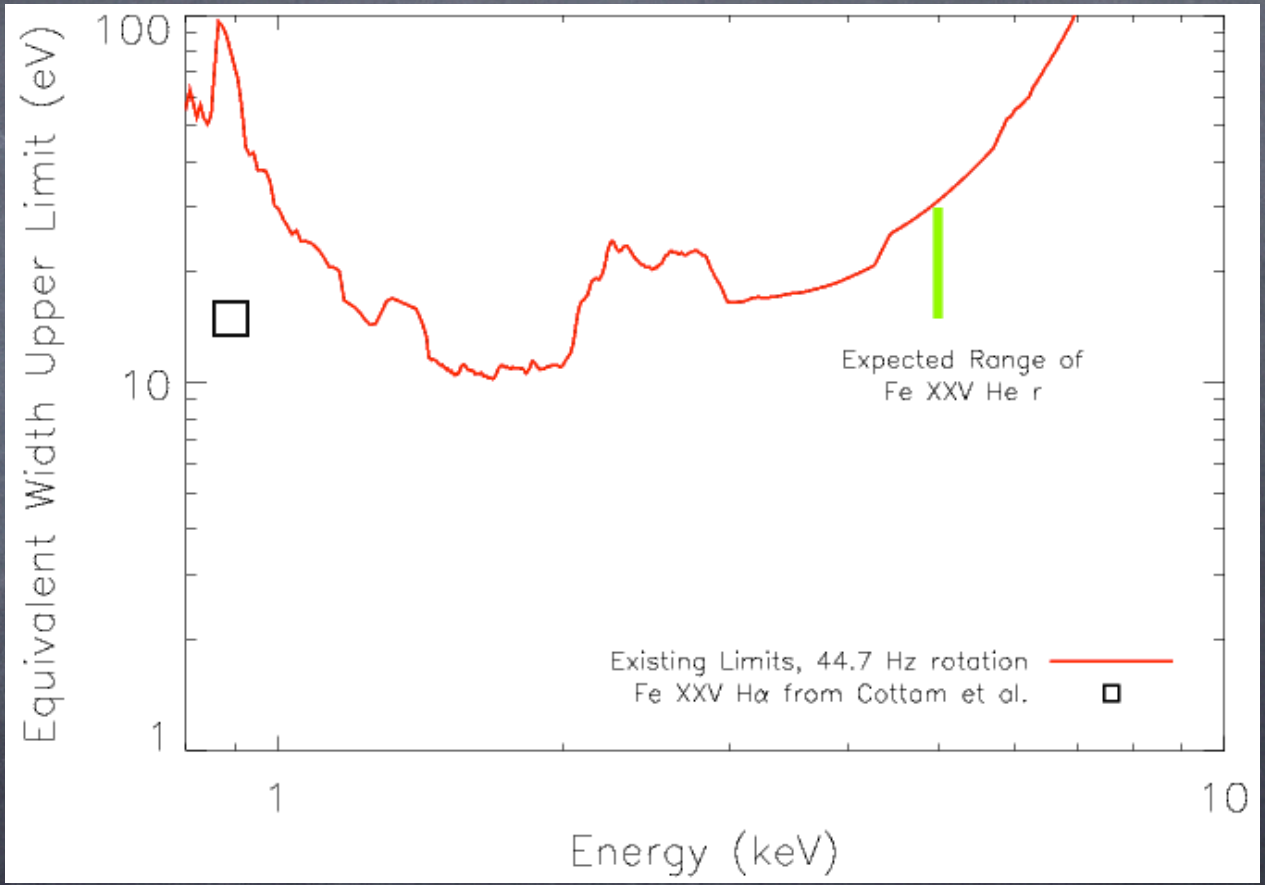
EXO 0748-676 Peak Results

- Current limit to Fe XXVI Lα is close to new prediction
- HETGS is x2-3 from detecting Fe XXVI Hα



EXO 0748-676 Tail Results

- Fe XXV He r limit is close to expected range
- HETGS is x10 from detecting Fe XXVI He 2-3



Upcoming Observations

- GS1826-238: 240 ks more with Chandra HETGS (PI: Rothschild)
  - Burst frequency is increasing
  - Limits should improve by x2
- MXB 1728-34: 250 ks with HETGS as part of HETG GTO time (PI: Canizares)
  - Should get about 20 bright bursts
  - Some bursts show radius expansion, using fast timing mode