

The IACHEC High-Resolution Working Group's view of
the X-ray emission-line spectrum of Capella

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IACHEC High-Resolution WG objectives

- Instrumental wavelength reference frame (*cf* effective area)
 - dynamics of plasmas
 - $1\text{m}\text{\AA}$ at 12\AA \Leftrightarrow 25 km/s
 - atomic physics
 - observed λ for databases
 - ATOMDB
 - CHIANTI
 - NIST
 - laboratory astrophysics
 - LLNL EBIT
 - theoretical calculations
 - HULLAC and other codes
 - $\Delta\lambda < 35\text{ m}\text{\AA}$
- Methods
 - DH's combined Chandra HETG spectra
 - Compare phenomenological & physical models
 - Exhaustive (and exhausting) tabulation of lines ion-by-ion
 - `vap` & `vmekal`

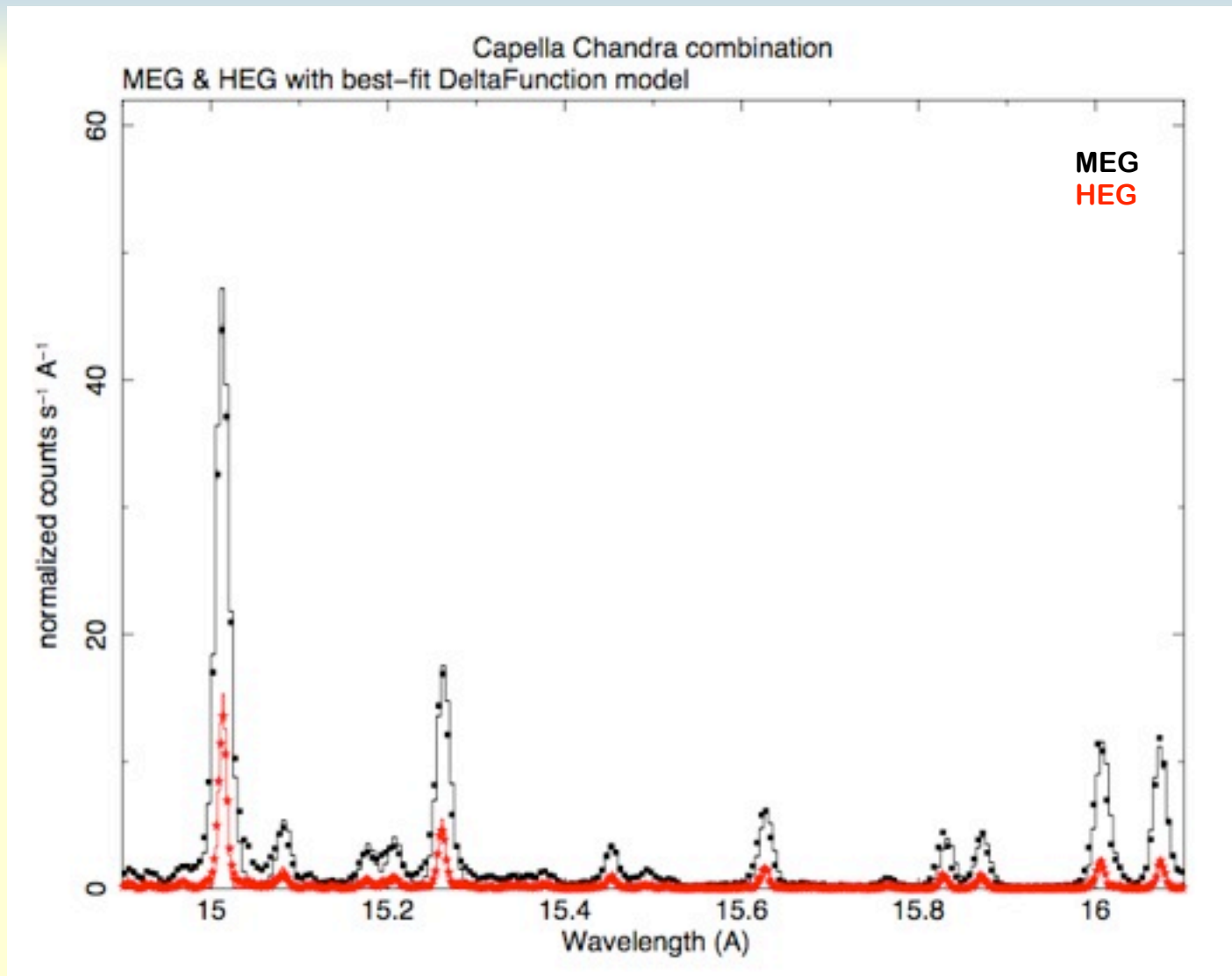
Ions in 2009 Capella HETG models

	H-like	He-like	Li-like	Be-like	B-like	C-like	N-like	O-like	F-like	Ne-like
N	VII									
O	VIII	VII								
F										
Ne	X	IX								
Na										
Mg	XII	XI								
Al	XIII	XII								
Si	XIV	XIII								
P										
S	XVI	XV								
Cl										
Ar	XVIII	XVII								
K										
Ca			XVIII							
Sc										
Ti										
V										
Cr										
Mn										
Fe			XXIV	XXIII	XXII	XXI	XX	XIX	XVIII	XVII
Co										
Ni									XX	XIX
Cu										
Zn										

Ions in 2010 Capella HETG models

	H-like	He-like	Li-like	Be-like	B-like	C-like	N-like	O-like	F-like	Ne-like
N	VII	VI								
O	VIII	VII								
F	IX	VIII								
Ne	X	IX								
Na	XI	X								
Mg	XII	XI								
Al	XIII	XII								
Si	XIV	XIII								
P	XV	XIV								
S	XVI	XV								
Cl										
Ar	XVIII	XVII	XVI	XV						
K										
Ca			XVIII	XVII	XVI	XV	XIV			
Sc										
Ti										
V										
Cr										
Mn										
Fe			XXIV	XXIII	XXII	XXI	XX	XIX	XVIII	XVII
Co										
Ni									XX	XIX
Cu										
Zn										

HETG spectra and models of Capella



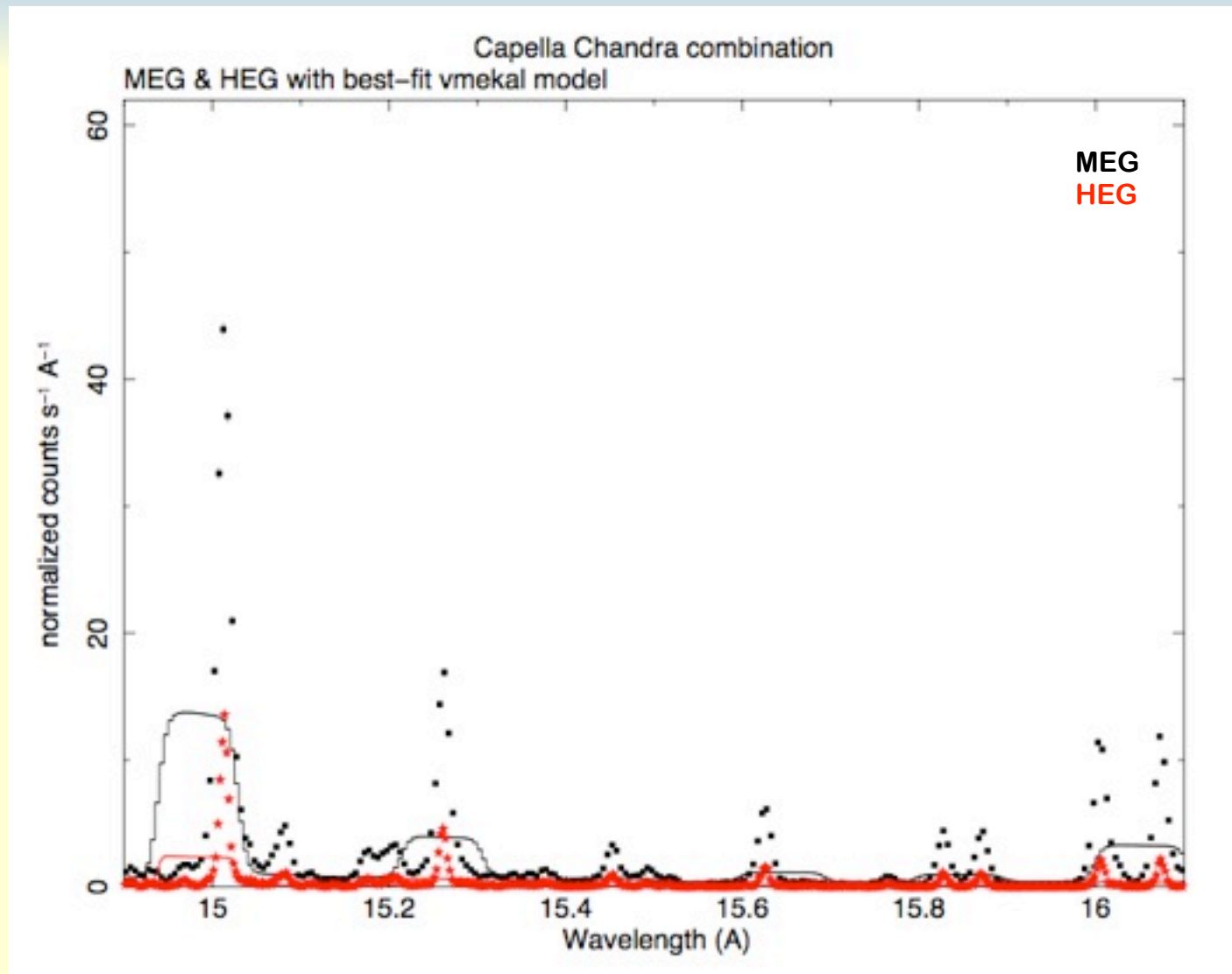
HETG spectra and physical models of Capella

XSPEC v12.4.0	vapex	vmekal
TBabs	$n_{\text{H}} = 1.8 \times 10^{21} \text{ cm}^{-2}$	
kT (keV)	0.59681 ± 0.00040	0.59355 ± 0.00042
norm	9.8339 ± 0.0044	9.2075 ± 0.0046
He	1.	1.
C	1.	1.
N	0.7384 ± 0.0253	0.6050 ± 0.0278
O	0.2592 ± 0.0030	0.3278 ± 0.0042
Ne	0.2659 ± 0.0024	0.2218 ± 0.0027
Na		0.2886 ± 0.0290
Mg	0.3514 ± 0.0025	0.4172 ± 0.0031
Al	0.3272 ± 0.0113	0.3025 ± 0.0113
Si	0.3846 ± 0.0032	0.4313 ± 0.0037
S	0.3105 ± 0.0100	0.2591 ± 0.0085
Ar	0.2258 ± 0.0237	0.3188 ± 0.0332
Ca	0.4192 ± 0.0246	0.0000 ± 0.0536
Fe	0.2978 ± 0.0016	0.2948 ± 0.0018
Ni	0.4280 ± 0.0056	0.3327 ± 0.0051
C-statistic	117120.2	419264.5
NPHA	16384	16384
NDOF	16371	16370

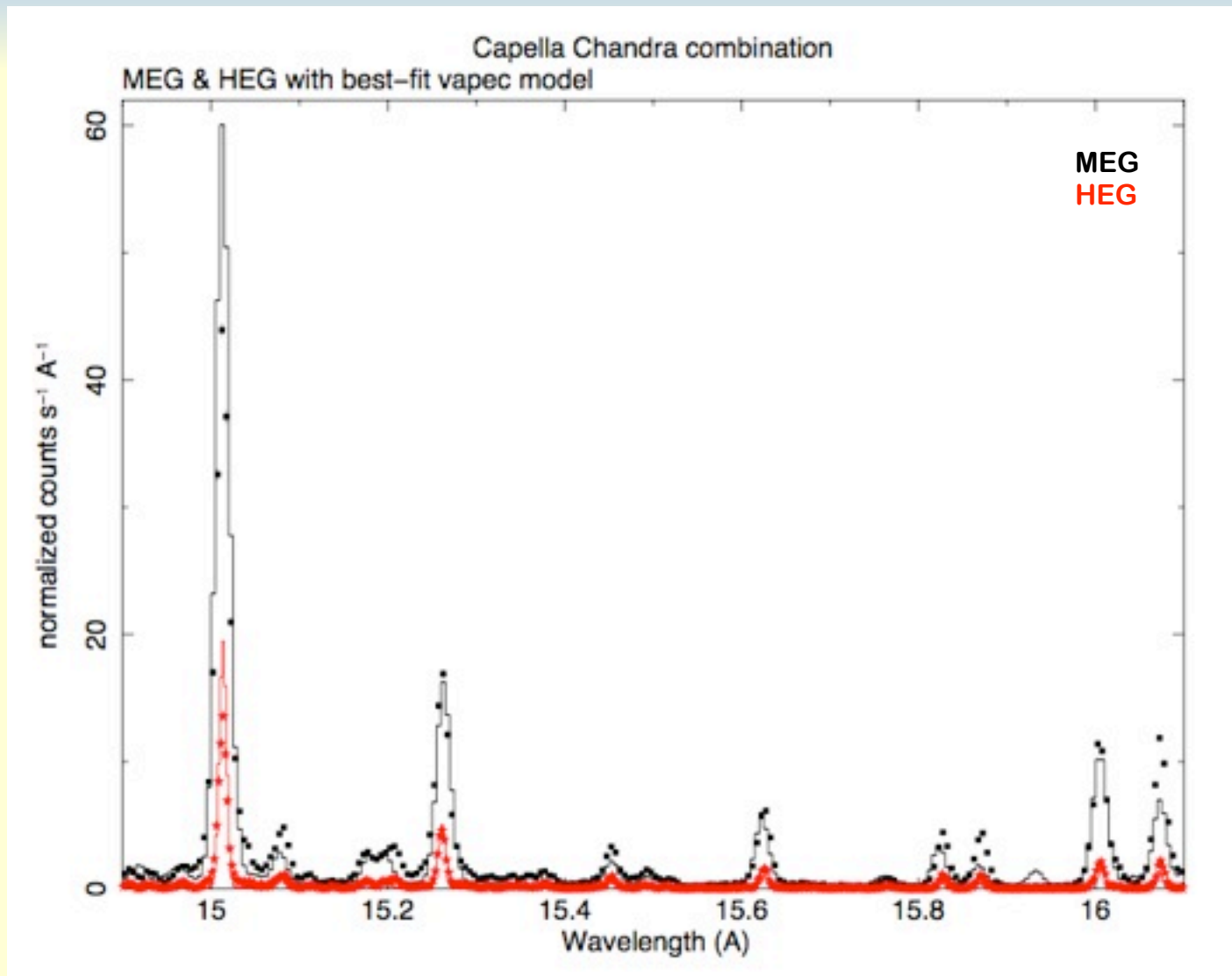
δ

111705.9
16384
11121

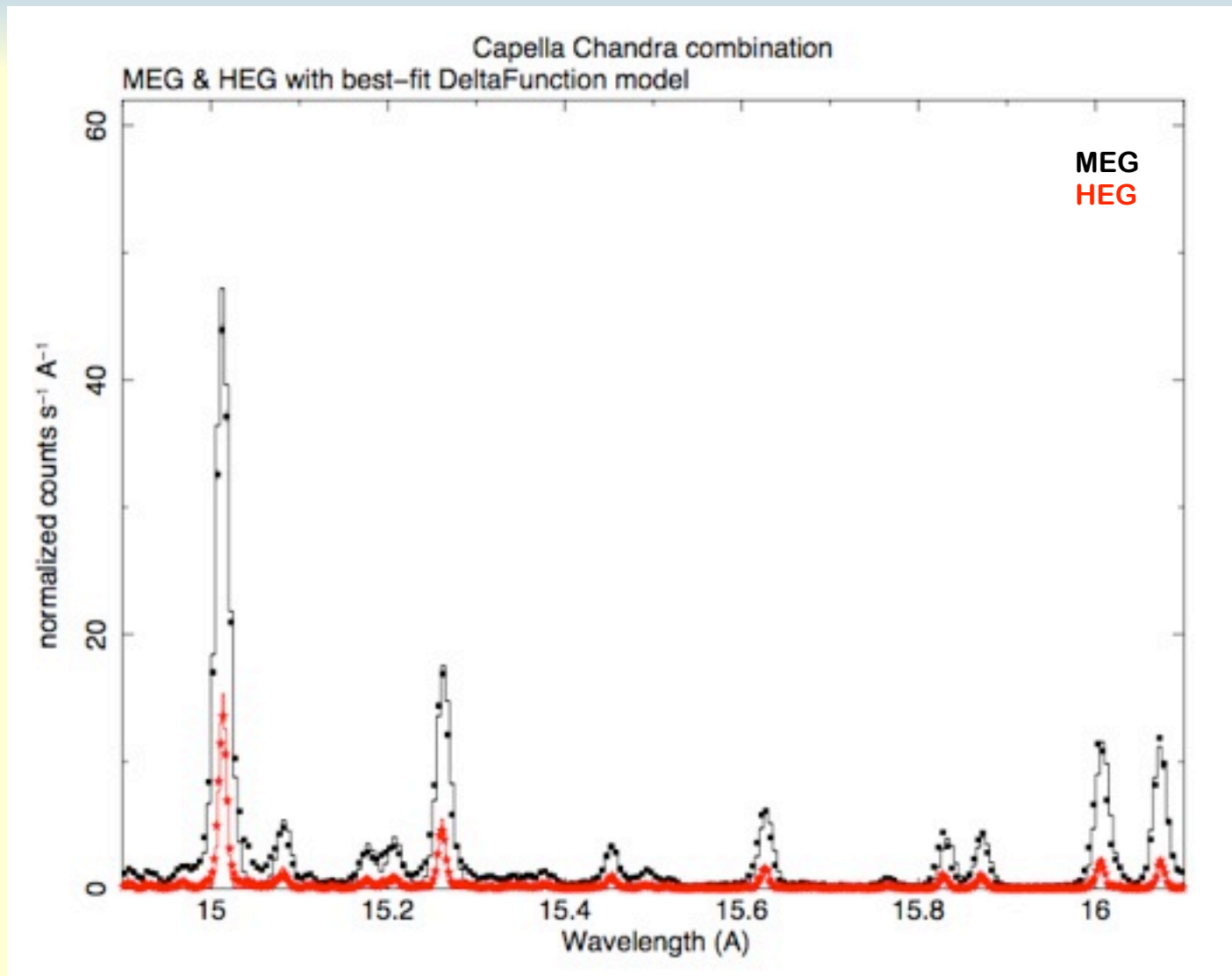
HETG spectra and models of Capella



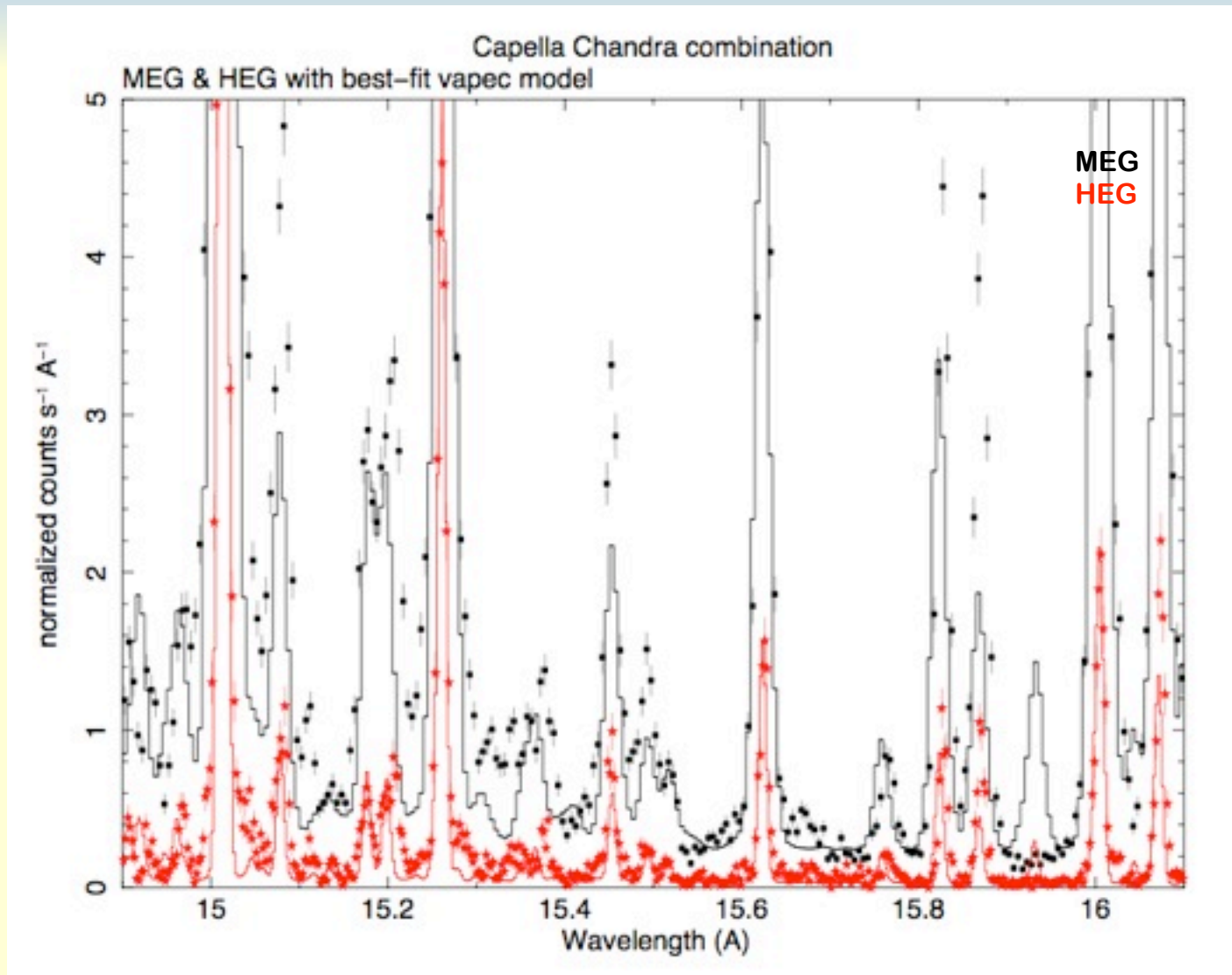
HETG spectra and models of Capella



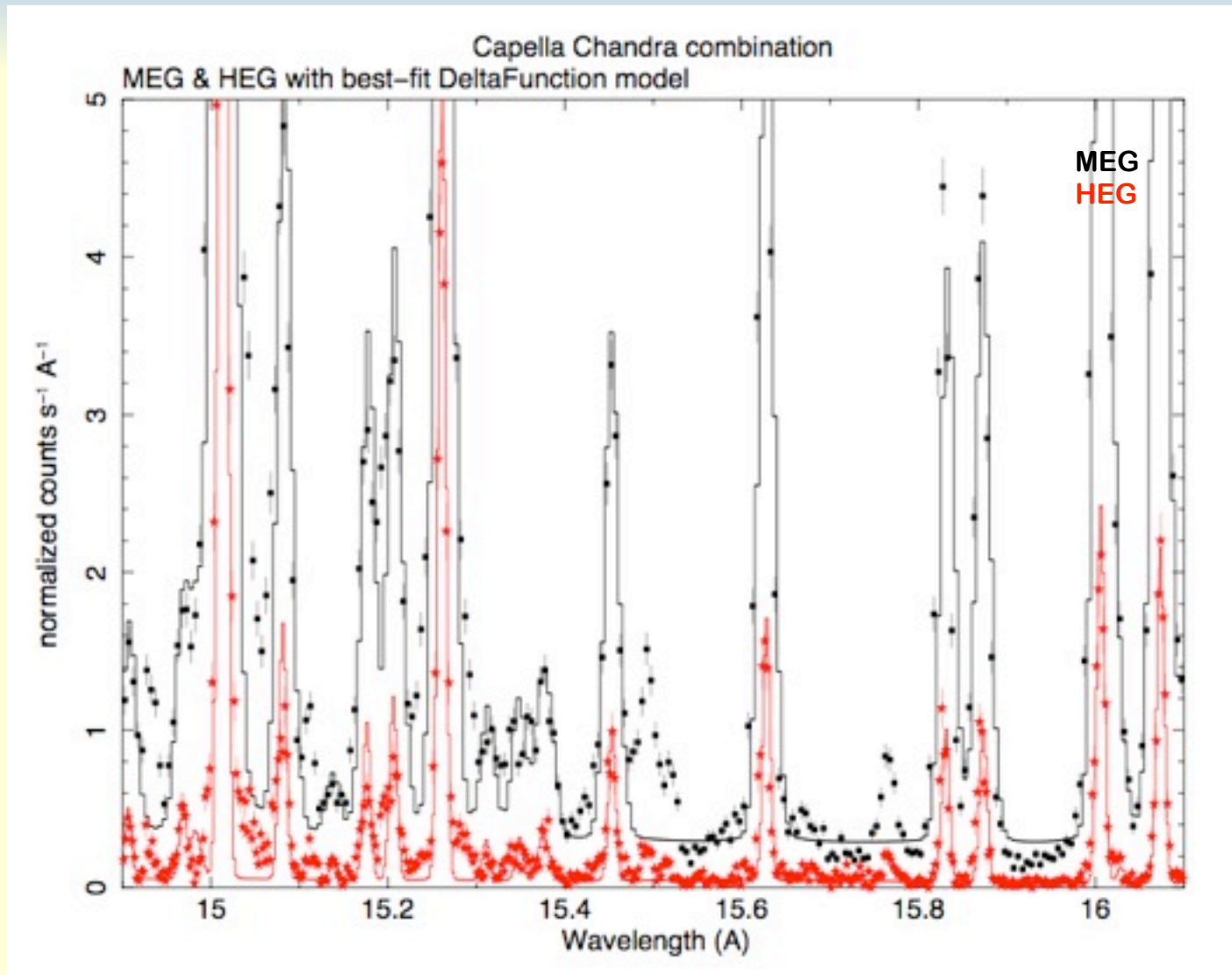
HETG spectra and models of Capella



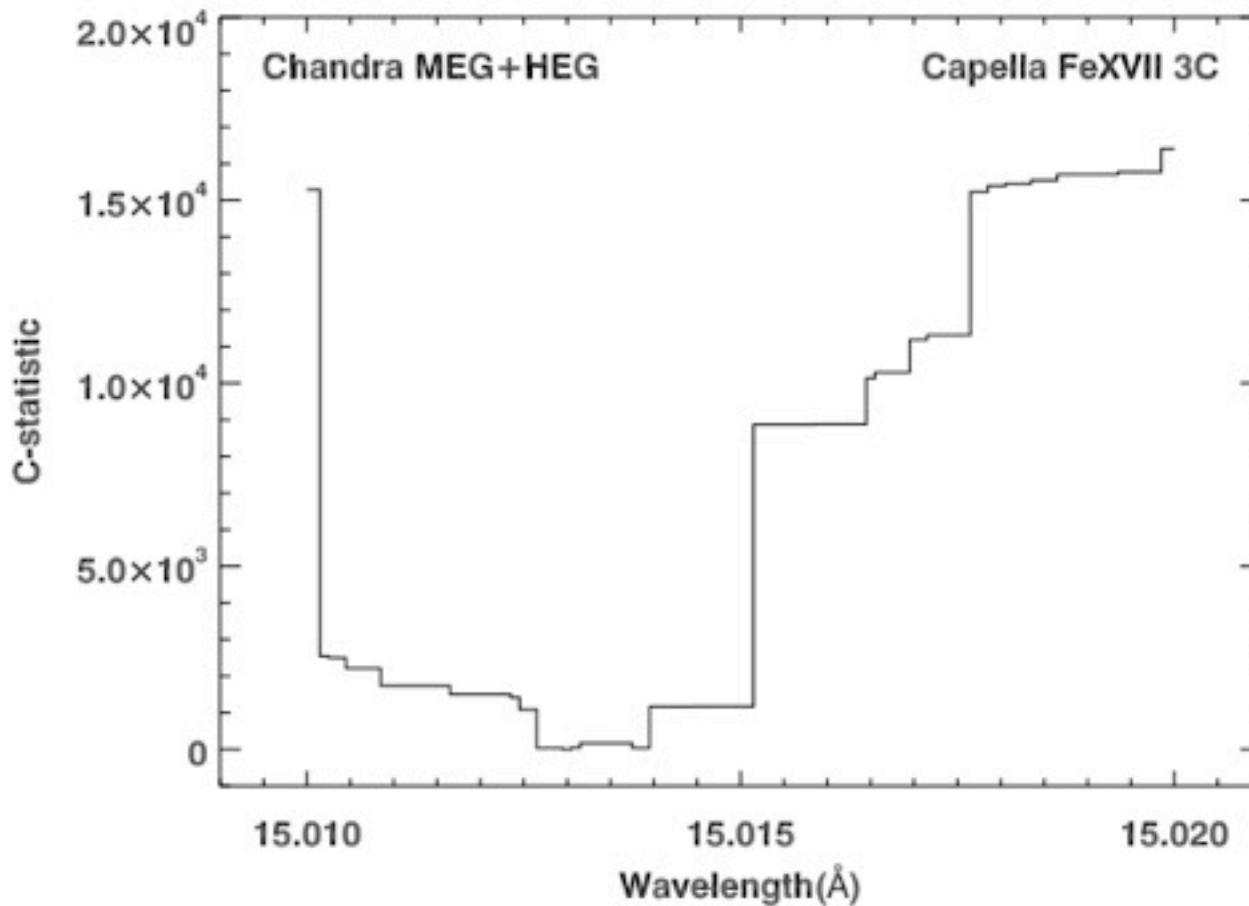
HETG spectra and models of Capella



HETG spectra and models of Capella



HETG δ -function models of Capella



Issues for the IACHEC WG this week

- Capella recruitment
 - HETG analysis review
 - high-resolution RMFs
 - 25×1Å interval `vapec` line-prospecting charts available
 - continuum questions
 - too high in `vapec`
 - APED NoLine with δ -function models
 - dielectronic recombination
 - publication plan
 - RGS
 - LETG
- General questions
 - Requirements for “VO” emission-line servers
 - Support for Laboratory Astrophysics
 - Request new measurements ?
 - XSPEC `vmekal`
 - Other targets