High spectral resolution in Mexico before 2009: two echelle spectrographs at OAN/SPM.

REOSC: ***R*** **≈ 18 000** @5000 Å

Mezcal: ***R*****<100 000** (small λ intervals)

Use of high-resolution spectroscopy:

Determination of detailed chemical composition;

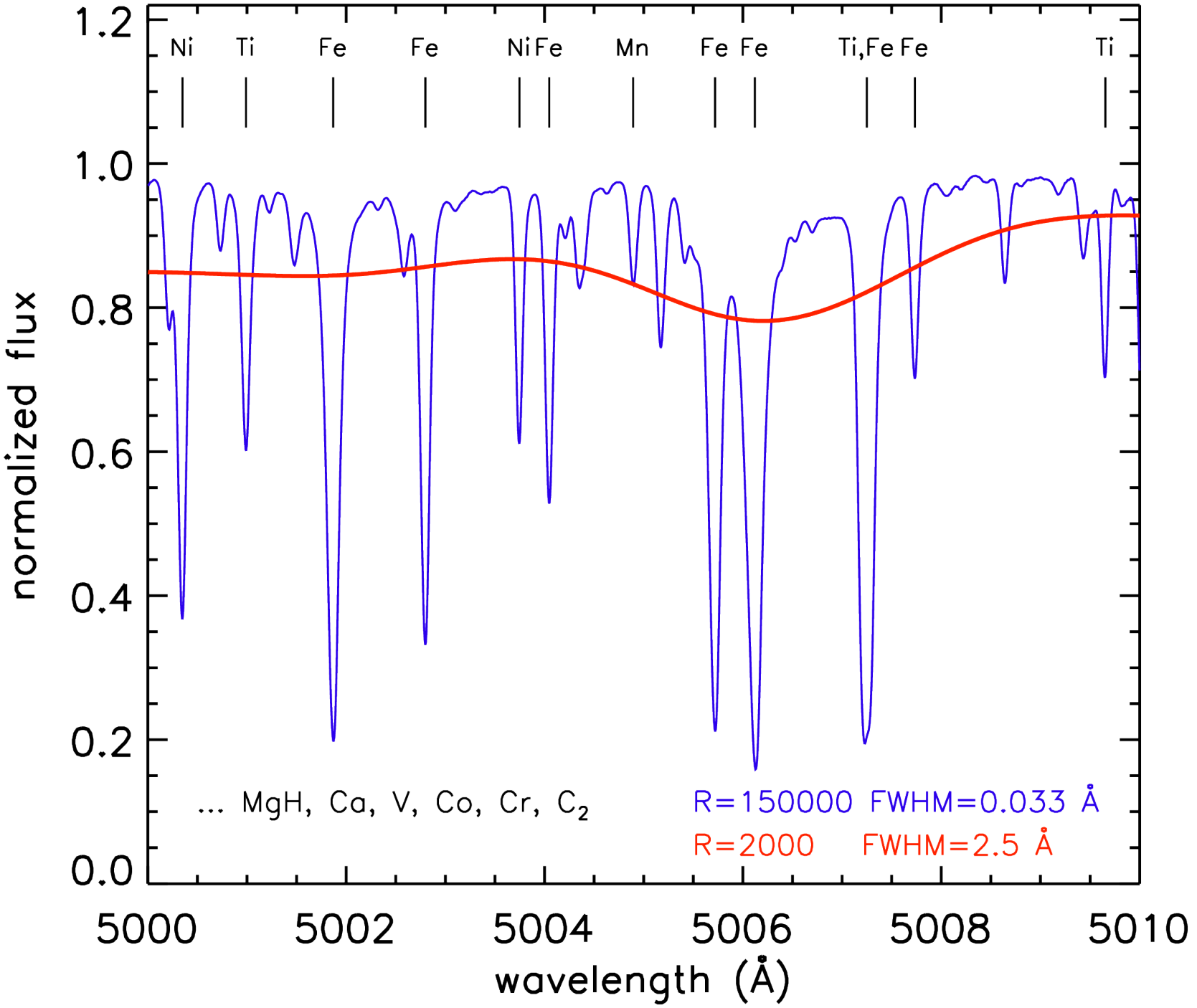
Astrophysical log gf ;

Velocity fields in the atmospheres (line bisector method);

Precise radial velocity (Doppler wobble);

Transmission spectroscopy for extrasolar planets atmosphere studies.

[…]


Ni
Ti
Fe
Fe
Ni Fe
Mn
Fe Fe
Ti,Fe Fe
Ti
1.2
1.0
0.8
0.6
0.4
0.2
0.0
normalized flux
... MgH, Ca, V, Co, Cr, C2
R=150000 FWHM=0.033 Å
R=2000 FWHM=2.5 Å
5000
5002
5004
5006
5008
5010
wavelength (Å)

Miguel

Yo

Daniel Eisenstein

Bob Peterson

Don Hunten

Julio 2008

The science with the LPL echelle spectrograph:

Water vapor in the atmosphere of **Mars** (Sprague et al. 2001, 2003, 2006; Hunten et al. 2000)

Sodium y **potassium** on the **Moon** surface (Sprague et al. 1992)

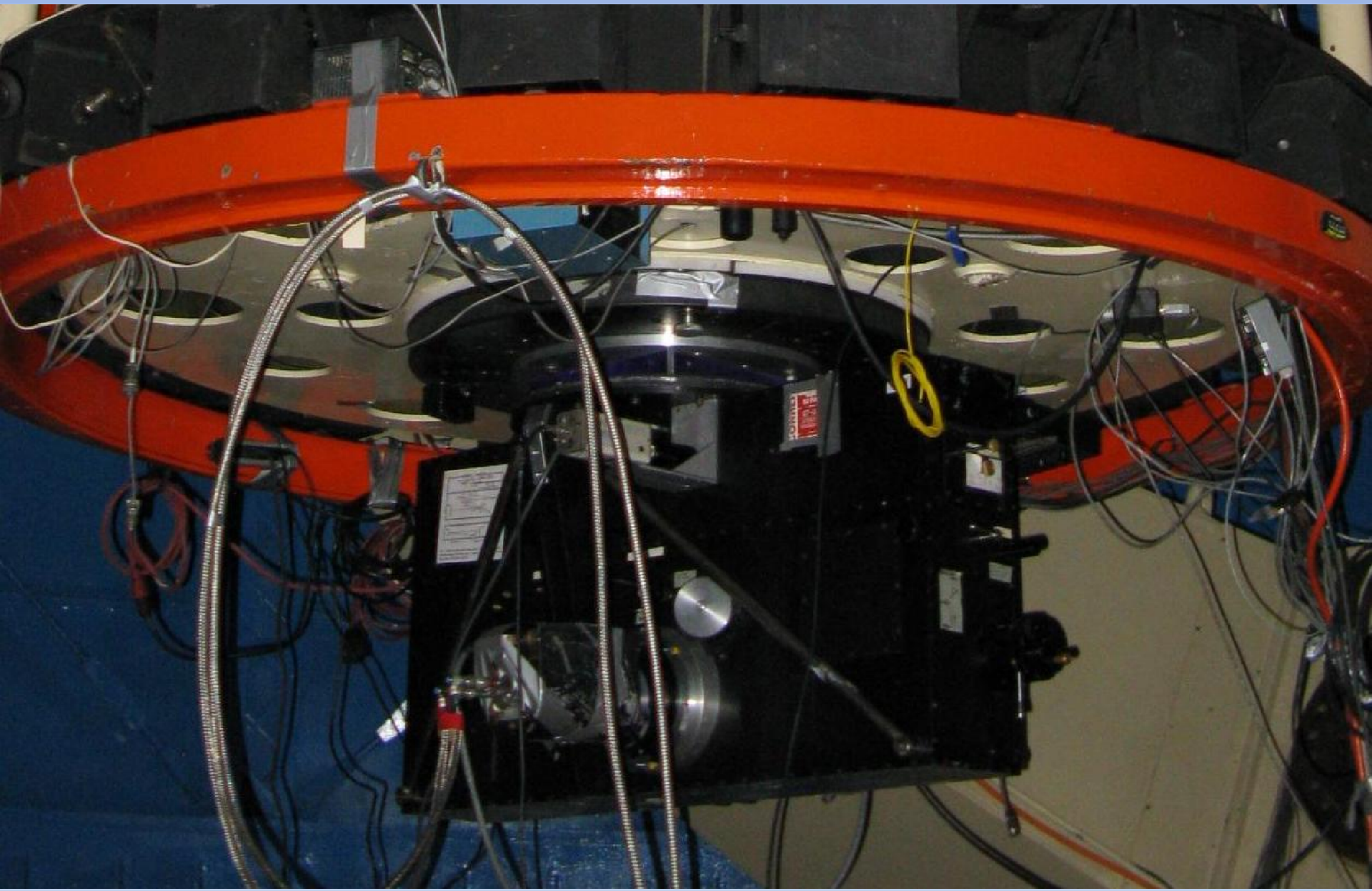
Calcium, Lithium, and Sodium in the atmosphere of **Mercury** (Sprague et al. 1993)

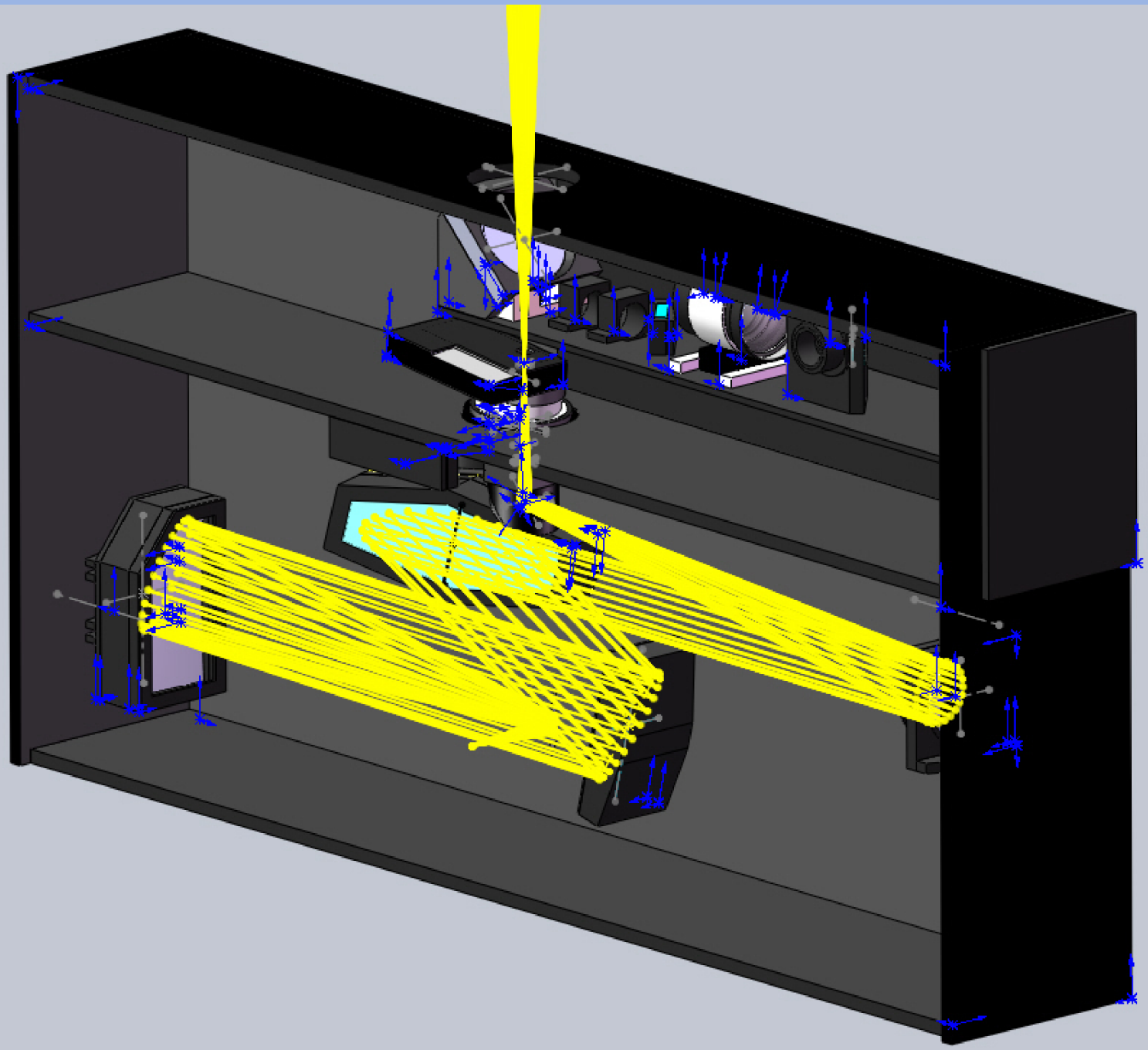
Sodium on **Ganymede** (Brown 1996)

[…]

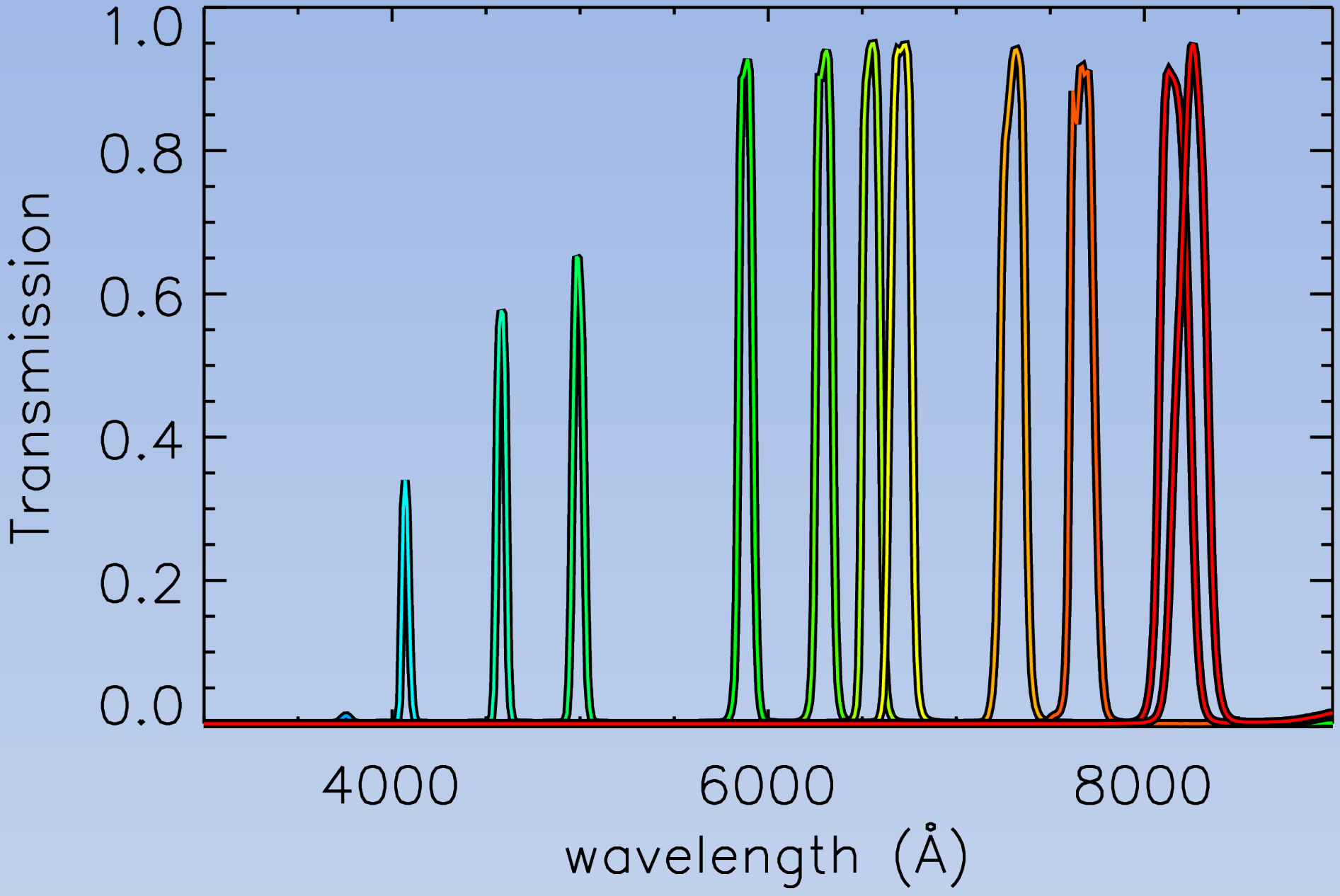
The 2.1m telescope of the **Observatorio Astrofísico Guillermo Haro** (Sonora, Mexico)

CanHiS attached to the 2.1 m telescope

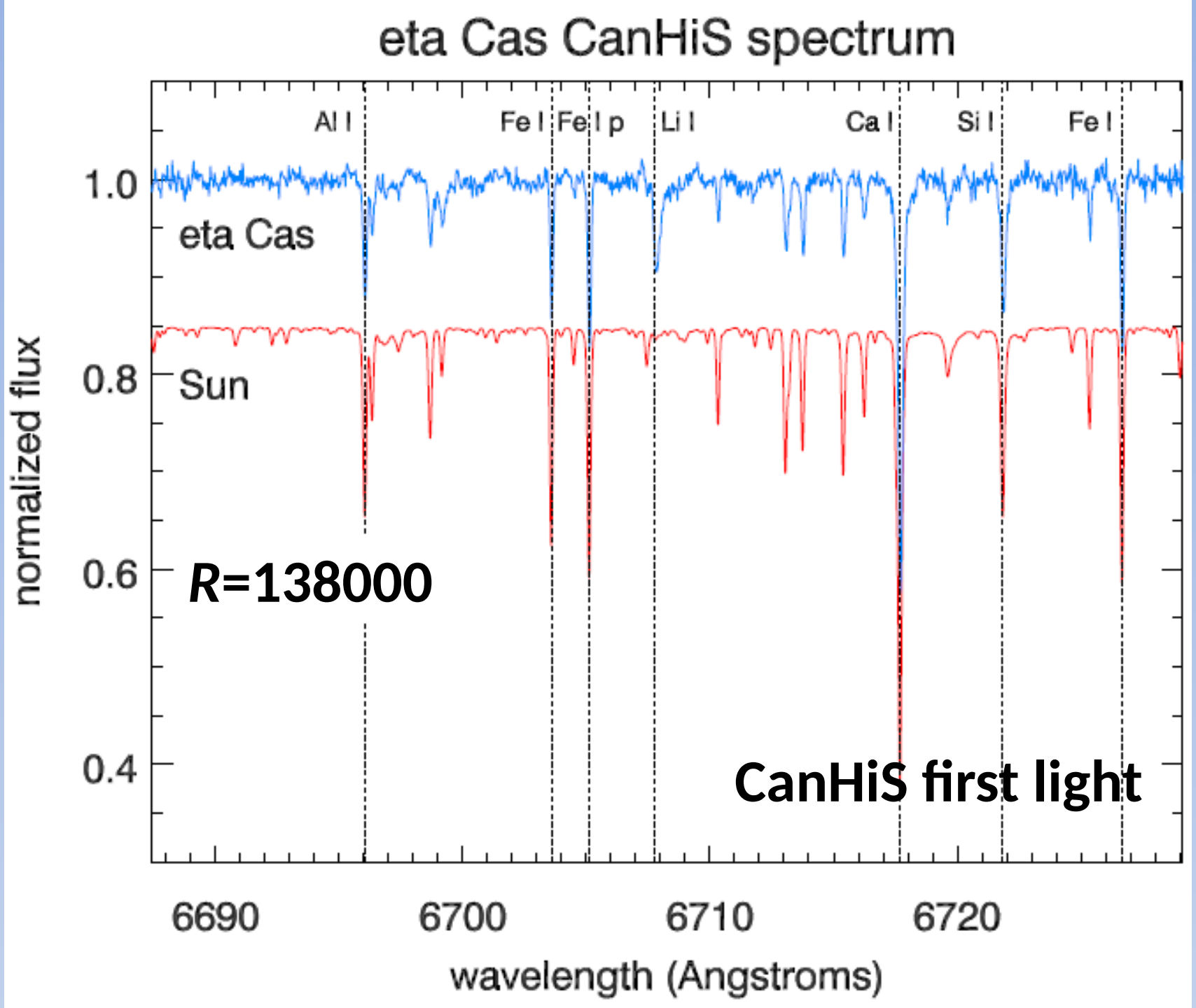




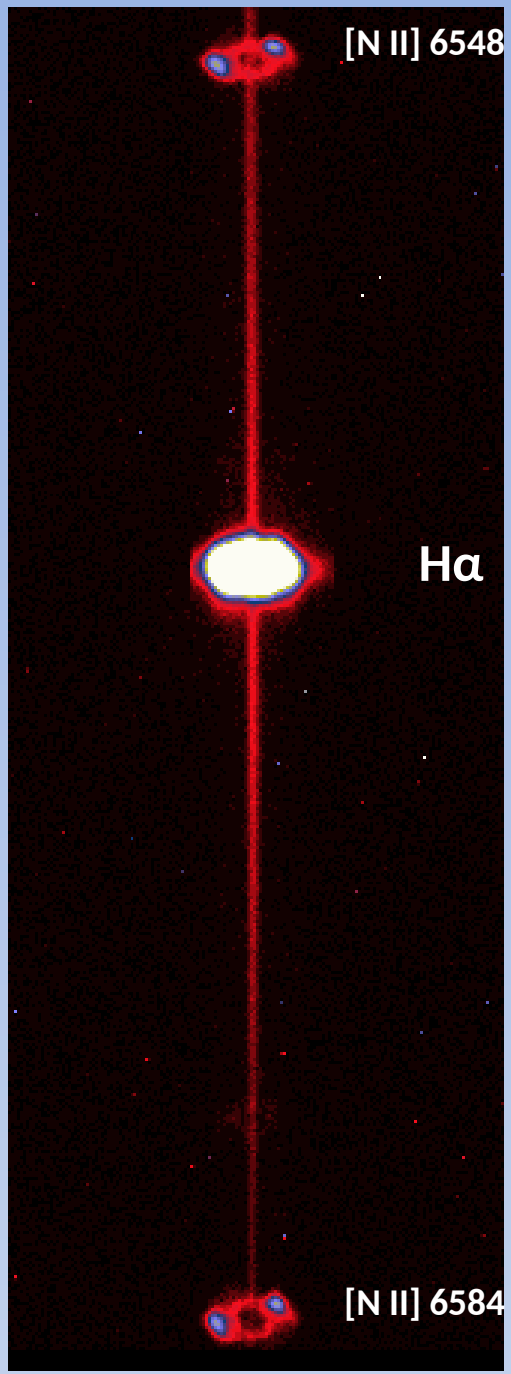
Medium band filters for order selection



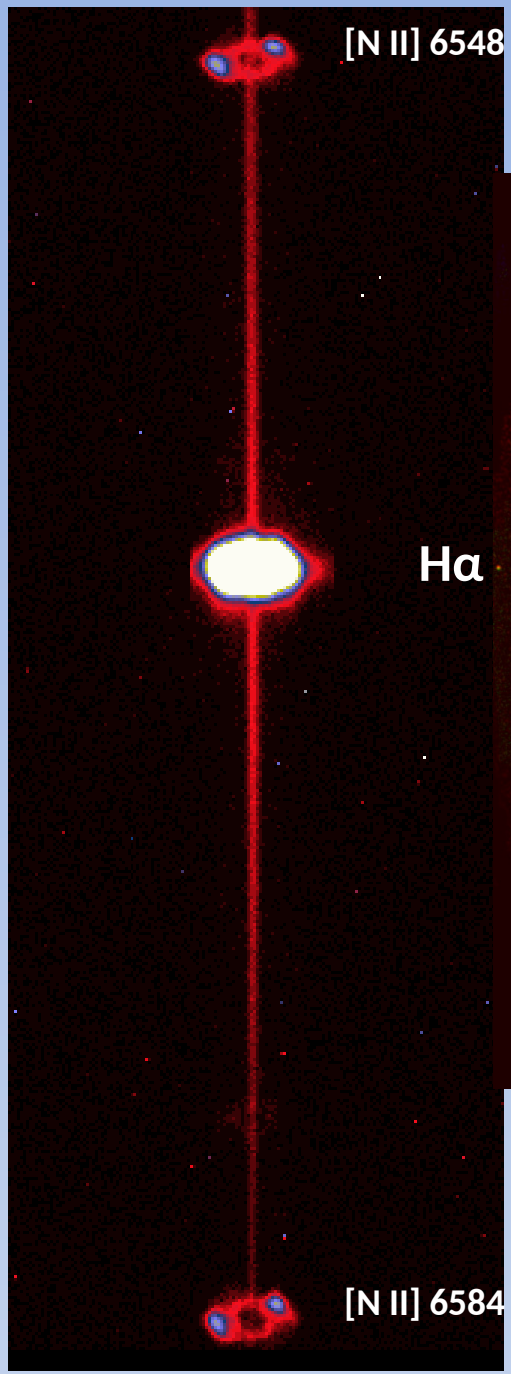
Entrance aperture (at 2.1 m – $f/12$ Cananea Telescope)	
Maximum (slit width ~ 50 μm)	$0\widehat{''}.410$
Minimum (slit width ~ 25 μm)	$0\widehat{''}.205$
Spatial resolution (at 2.1 m – $f/12$ Cananea Telescope)	
Maximum (slit length ~ 4.62 mm)	$37\widehat{''}.8$
Minimum (slit length ~ 2.81mm)	$23\widehat{''}.0$
Resolution $\delta\lambda$	
Maximum (at minimum slit width)	~ 0.03 Å
Minimum (at maximum slit width)	~ 0.08 Å
Power resolution $\mathcal{R} = \lambda_c/\delta\lambda$	
Maximum	~ 190000
Minimum	~ 85000
Typical wavelength range $\Delta\lambda$	~ 50 Å (near to 4500 Å)
	~ 90 Å (near to 6300 Å)
	~ 140 Å (near to 7800 Å)

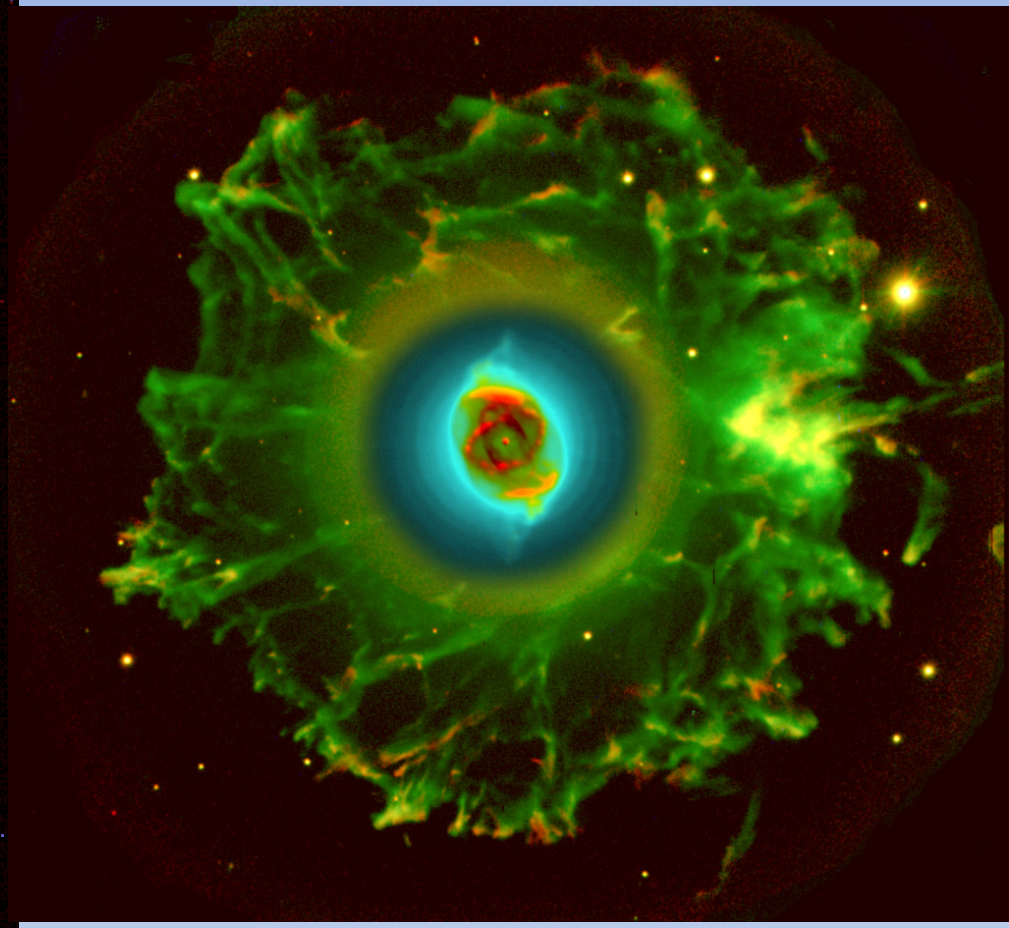

eta Cas CanHiS spectrum
Al I
Fe I
Fe I p
Li I
Ca I
Si I
Fe I
1.0
0.8
0.6
0.4
eta Cas
Sun
R=138000
CanHiS first light
normalized flux
6690
6700
6710
6720
wavelength (Angstroms)

Planetary nebula NGC6543 “Cat’s Eye”

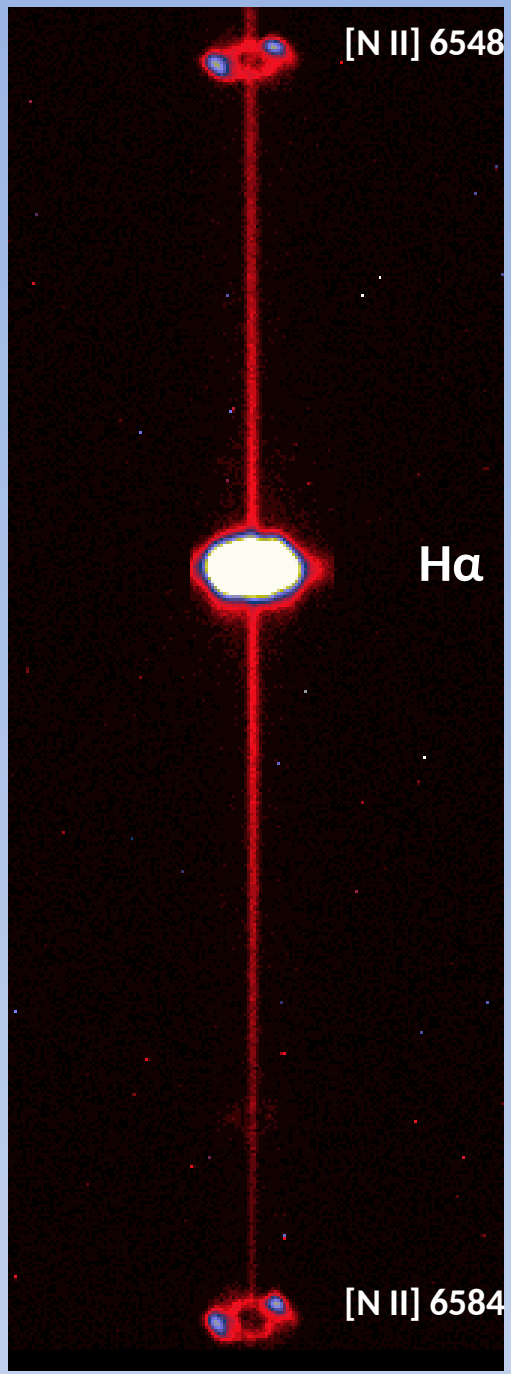


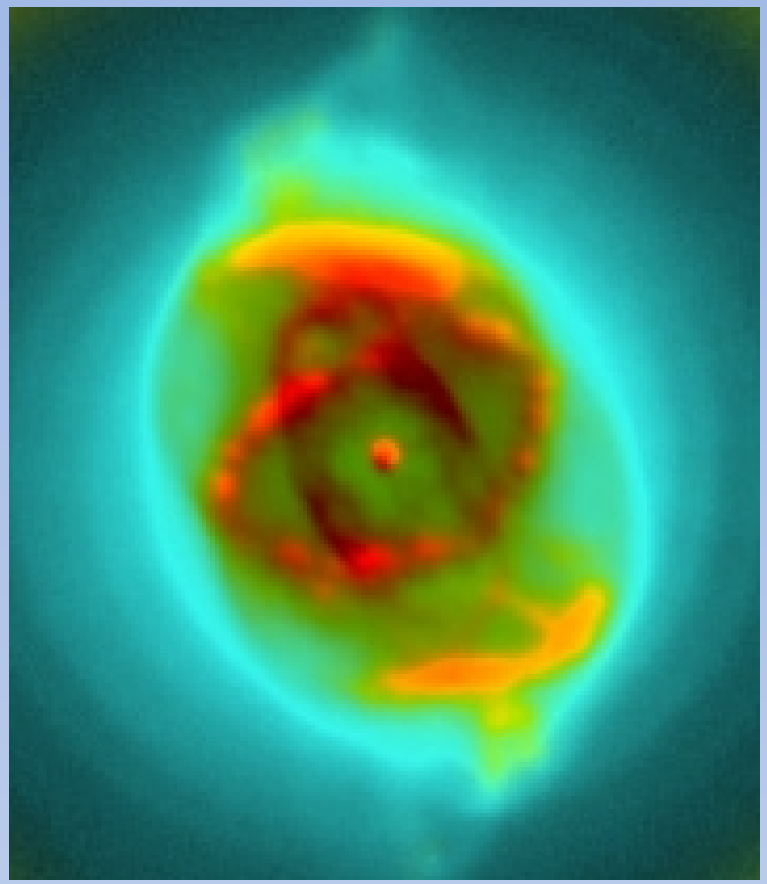
Planetary nebula NGC6543 “Cat’s Eye”



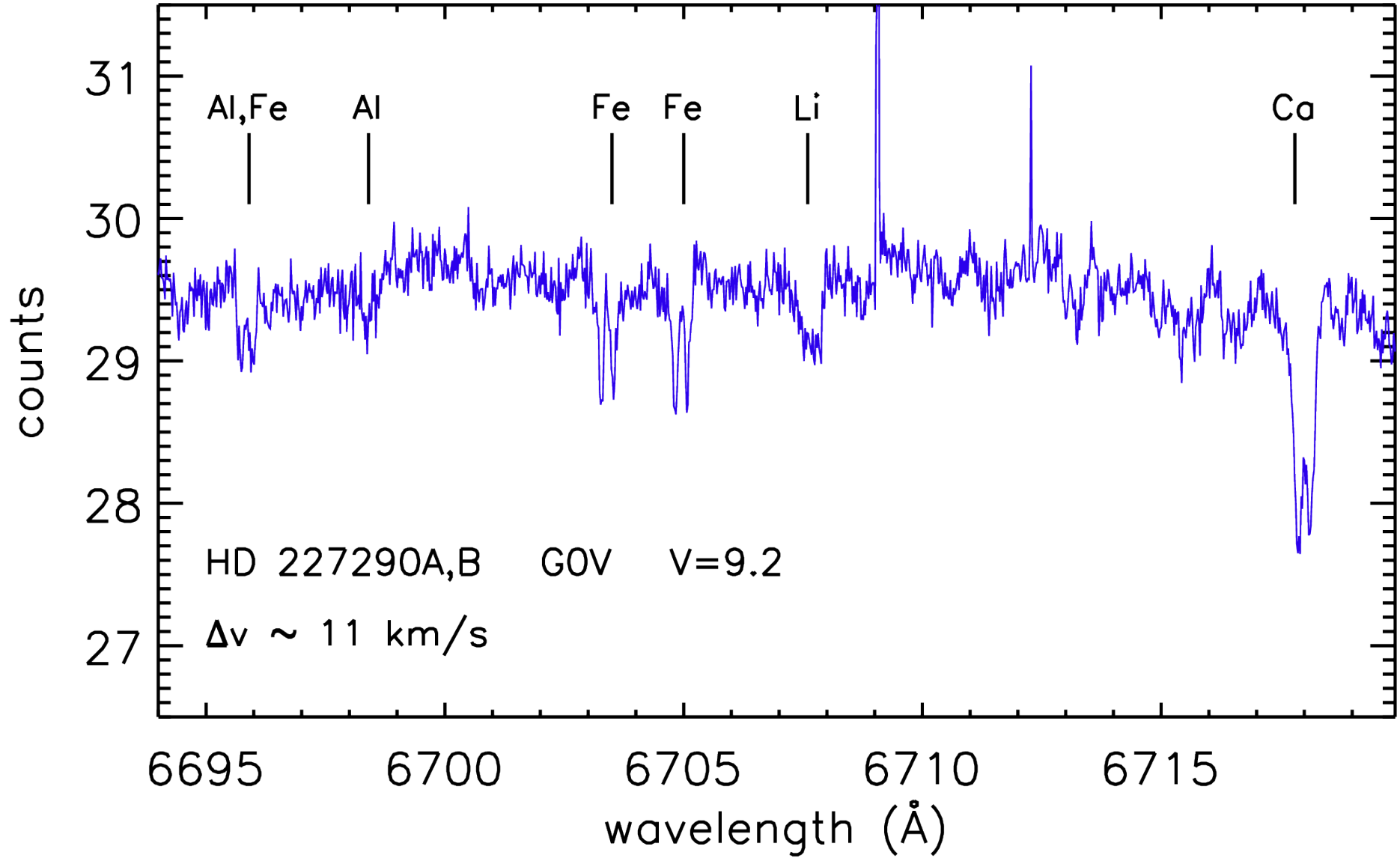


Planetary nebula NGC6543 “Cat’s Eye”





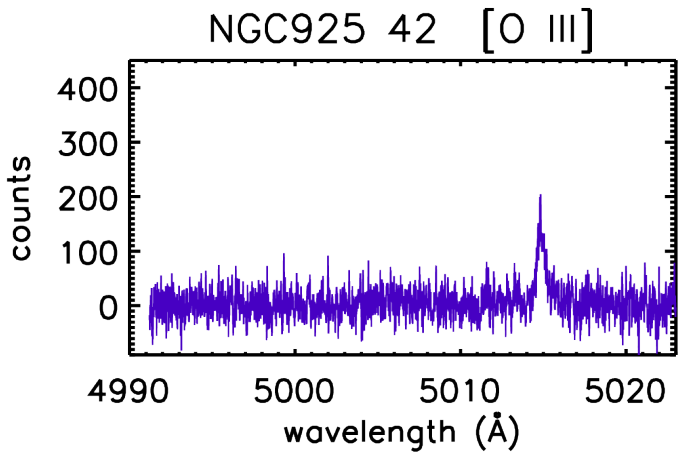
Discovery of new double-peak spectroscopic binaries

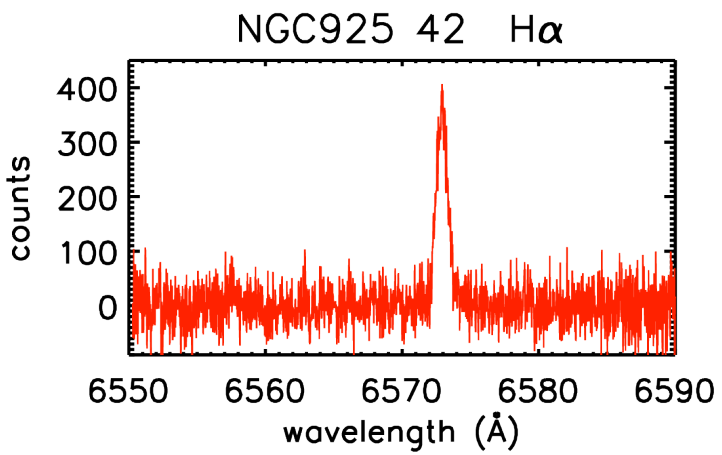


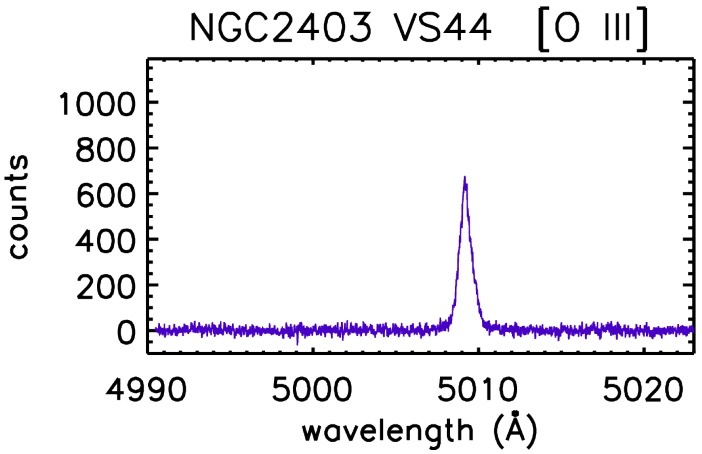
Hubble constant determination with giant H II regions and H II galaxies: calibration of L(Hβ) – σ relation.

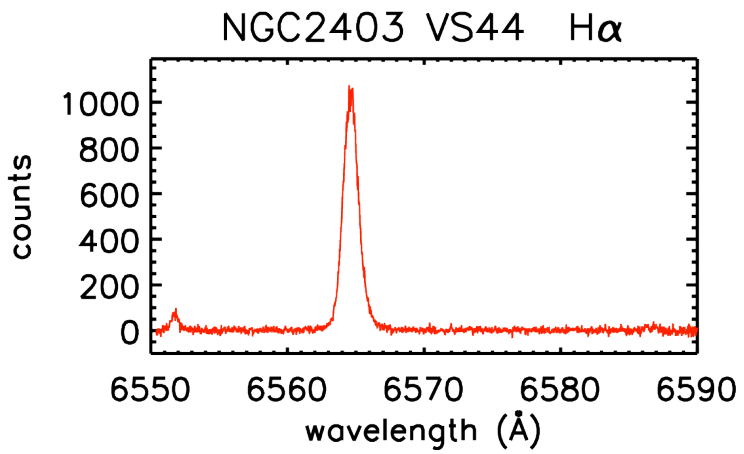
David Fernandez (INAOE)
Ricardo Chavez (INAOE)
Roberto Terlevich (INAOE)
Elena Terlevich (INAOE)
Manolis Plionis (Thessaloniki Univ.)
Spyros Basilakos (Acad. Of Athens)
Fabio Bresolin (Univ. of Hawaii)
Jorge Melnick (ESO)

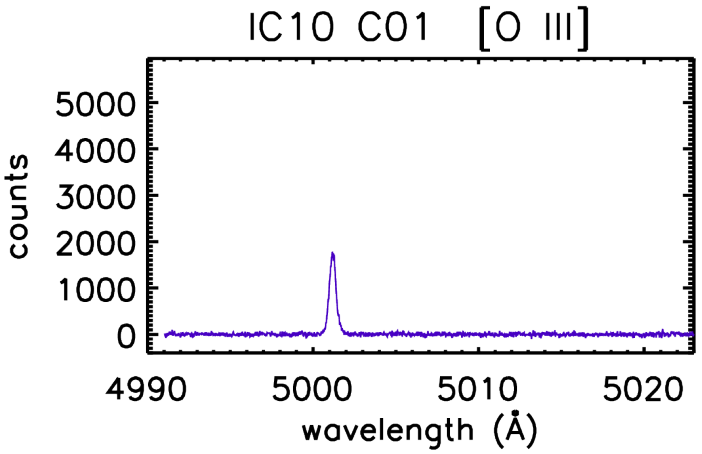
H_0 con H II

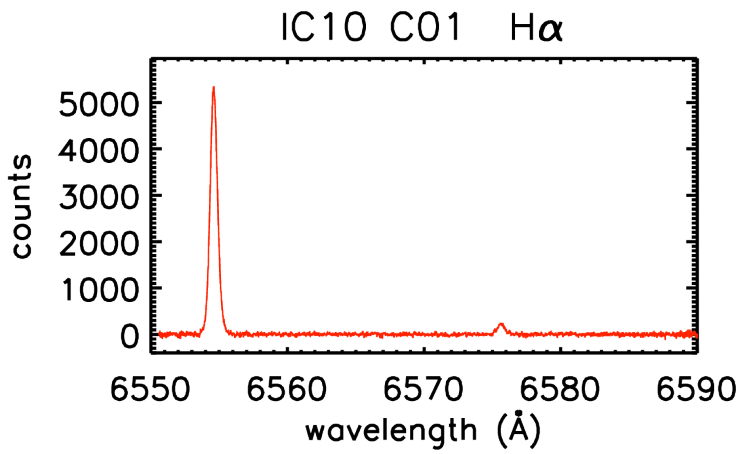

NGC925 42 [O III]
counts
400
300
200
100
0
4990
5000
5010
5020
wavelength (Å)


NGC925 42 Hα
counts
400
300
200
100
0
6550
6560
6570
6580
6590
wavelength (Å)


NGC2403 VS44 [O III]
counts
1000
800
600
400
200
0
4990
5000
5010
5020
wavelength (Å)


NGC2403 VS44 Hα
counts
1000
800
600
400
200
0
6550
6560
6570
6580
6590
wavelength (Å)


IC10 C01 [O III]
counts
5000
4000
3000
2000
1000
0
4990
5000
5010
5020
wavelength (Å)


IC10 C01 Hα
counts
5000
4000
3000
2000
1000
0
6550
6560
6570
6580
6590
wavelength (Å)

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Lithium abundance in a sample of solar-like stars

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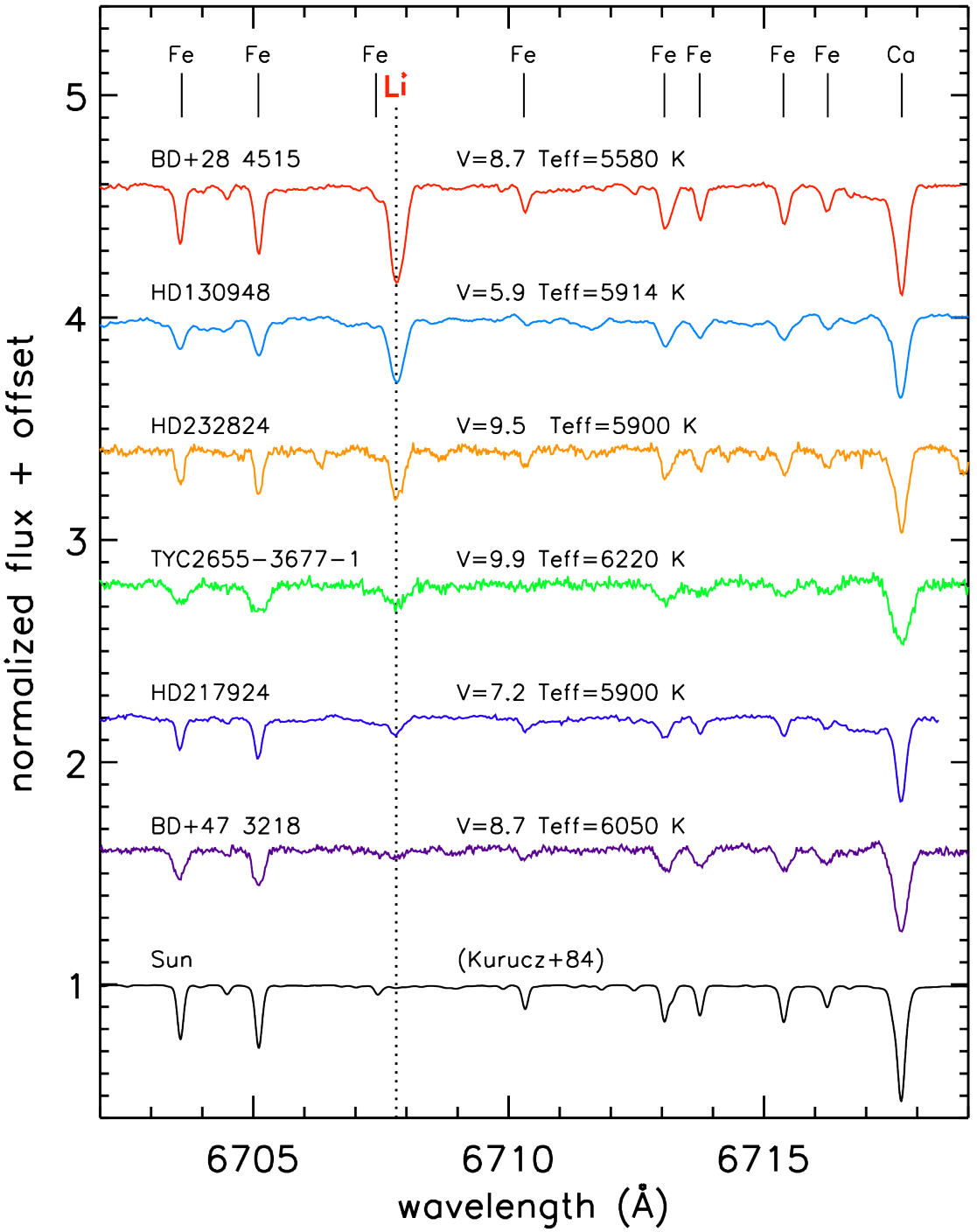
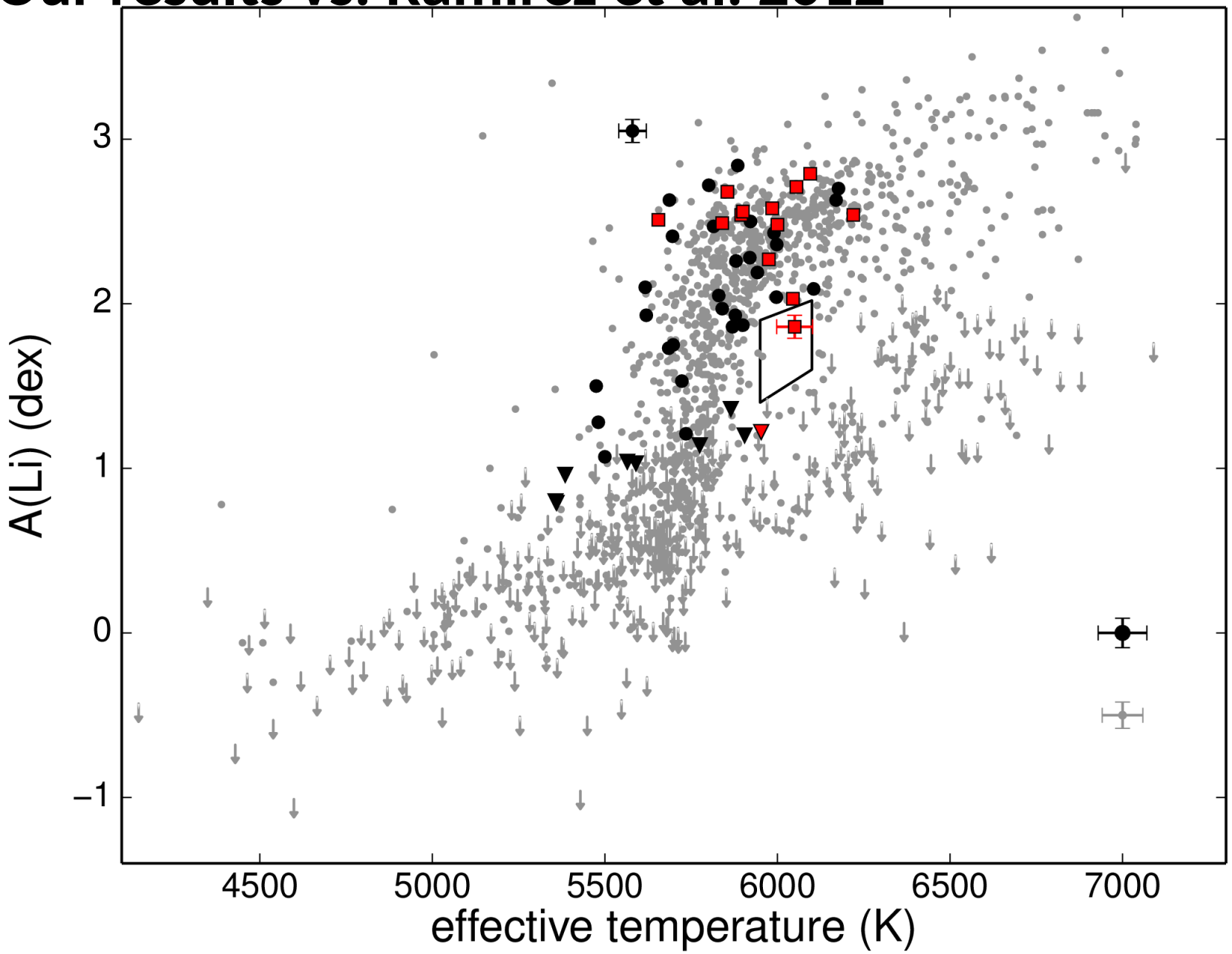

Fe
Fe
Fe
Li
Fe
Fe
Fe
Fe
Fe
Ca
BD+28 4515
V=8.7 Teff=5580 K
HD130948
V=5.9 Teff=5914 K
HD232824
V=9.5 Teff=5900 K
TYC2655−3677−1
V=9.9 Teff=6220 K
HD217924
V=7.2 Teff=5900 K
BD+47 3218
V=8.7 Teff=6050 K
Sun
(Kurucz+84)
normalized flux + offset
1
2
3
4
5
6705
6710
6715
wavelength (Å)

Our results vs. Ramirez et al. 2012



Our results vs. Ramirez et al. 2012