



Long term spectral monitoring of a small sample of white dwarfs

U.K. National Astronomy Meeting, Durham, July 2025

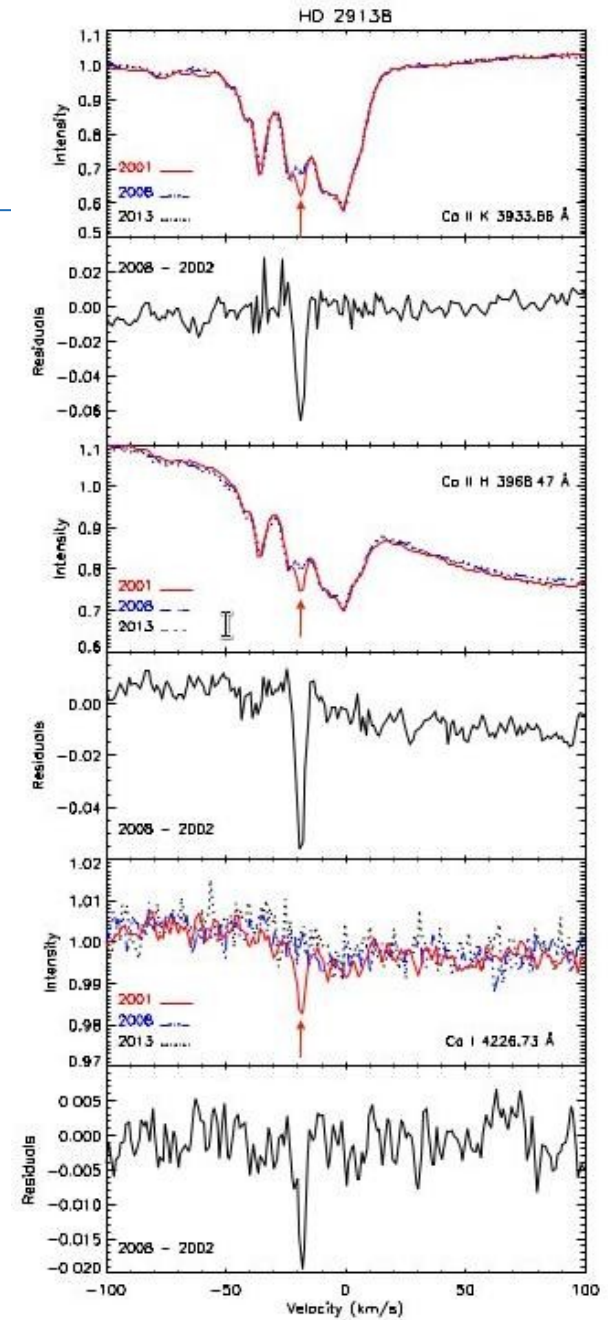
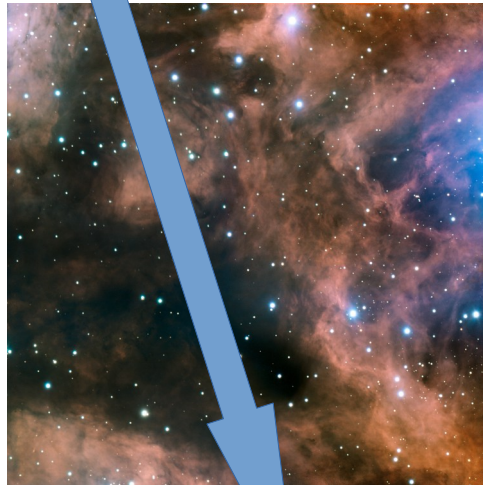
Jonathan Smoker



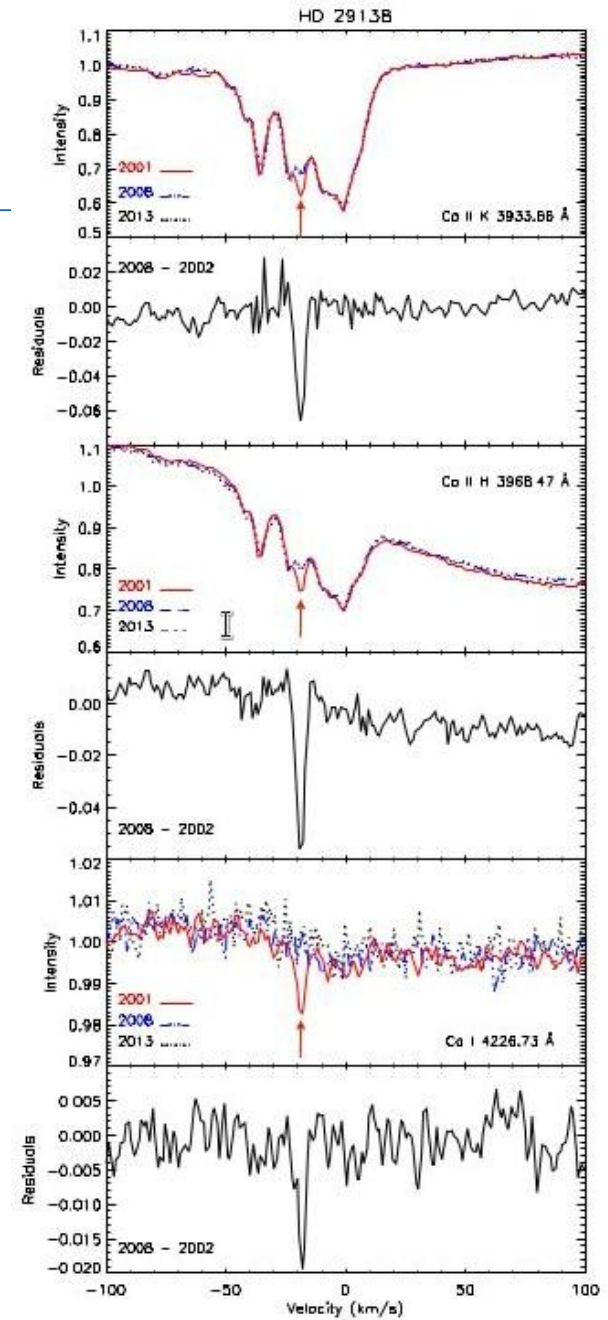
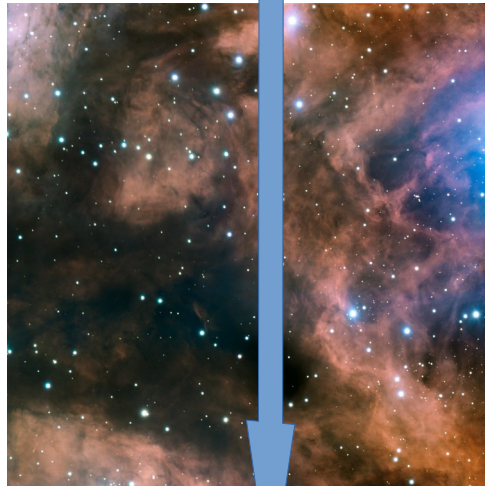
- Time variability in the ISM
- Standard stars at ESO
- Search for CaK absorption in a small sample
Of white dwarfs and SD strars
- Conclusions and future work



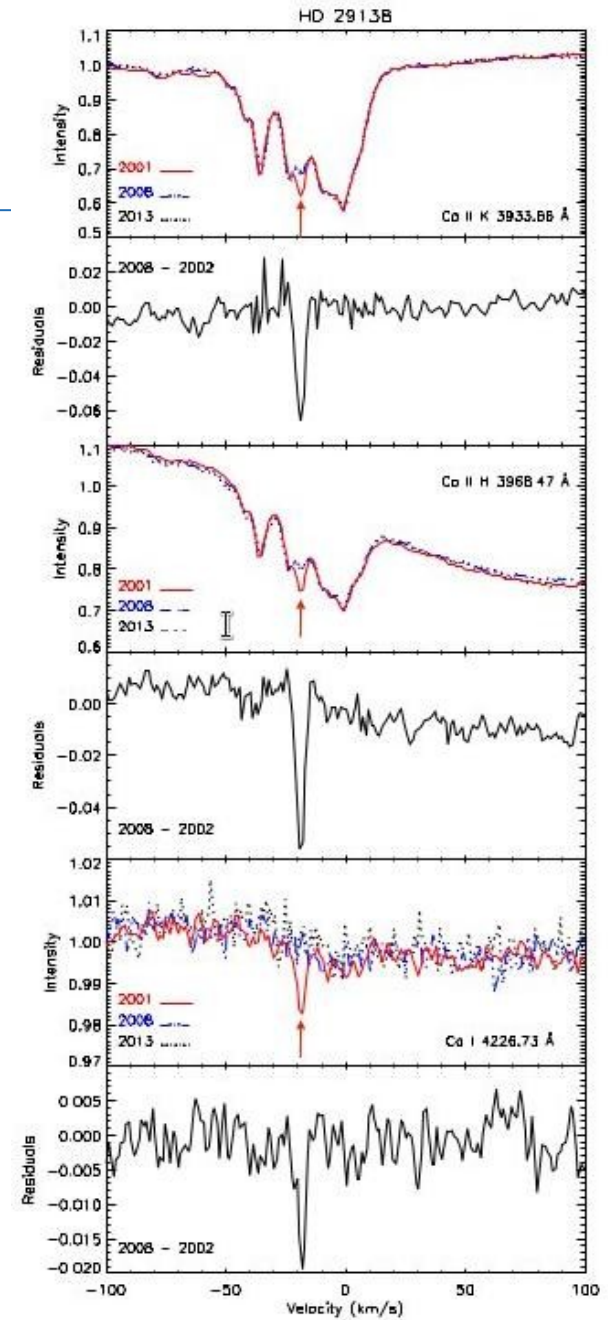
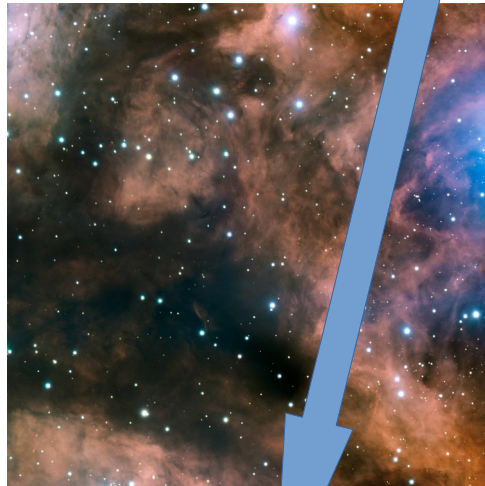
Time variability in the ISM



Time variability in the ISM



Time variability in the ISM

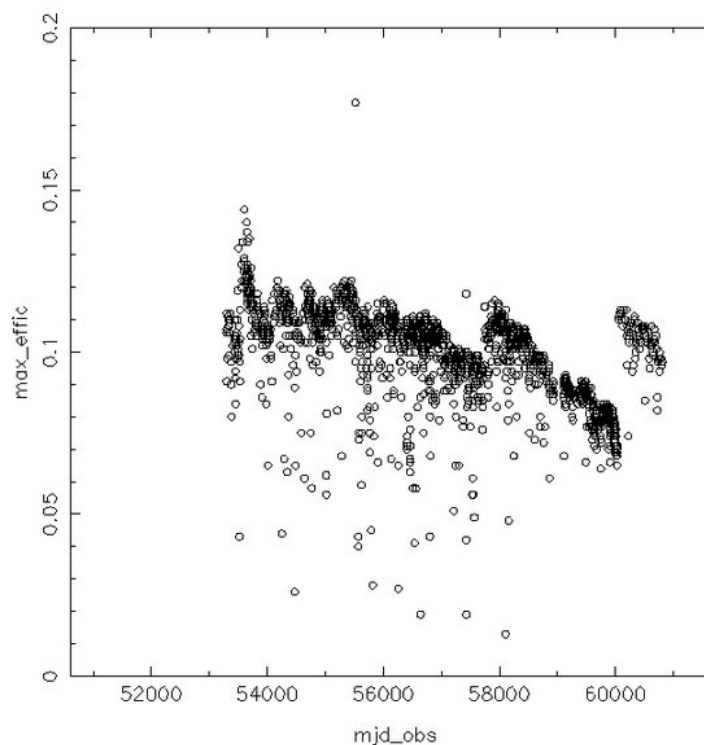


UVES peak throughput from 2000 to 2025 in the 437-nm setting.

Jumps can be caused by different pipeline versions and mirror re-aluminisation.

Observations are not always taken in photometric conditions.

Summary Information	
table	uves_std
x axis	mjd_obs
y axis	max_effic
from	2000-01-01 (mjd=51544)
to	2025-07-09 (mjd=60865)
bin	1x1
lambda_central	4370.0000
ins_mode	any
det_read_speed	1pt/225kHz/lg
type_flag	any
chip	any





UVES spectrophotometric standards – a total of about 3000 observations in certain wavelength settings over a 25 years timespan



Ultraviolet and Visual Echelle Spectrograph

SCIENCE ARCHIVE FACILITY

UVES Raw Data Query Results

[How to use?](#) [Other Instruments](#) [Archive FAQ](#) [Archive Facility HOME](#) [ESO HOME](#)

To request data please mark the checkbox in the left-most column (or click anywhere in the row), then press the **Request marked datasets** button.

Datasets for which the proprietary period is over are highlighted in **green** and are publicly available.

Datasets that are still under the proprietary period are highlighted in **red** and can only be downloaded by the corresponding PI.

Datasets that are not yet available in the Archive are marked with a "N/A".

Follow the link on the ob_id field to see all the datasets of that Observing Block (OB), logically sorted.

Follow the link on the ob_container_id field to see all the datasets of all related OBs, logically sorted.

Follow the link on the ob_container_parent id field to see all the datasets of all related containers, logically sorted.

Any comments or suggestions for improvement of this form can be sent to the [ESO Operations Helpdesk](#).

☒ Request marked datasets ☐ Request marked datasets (old way)

Mark	More	HDR	Release Date	Object	Target Ra, Dec	Target l, b	Program ID	DP.ID	EXPTIME	DPR.CATG	DPR.TYPE	DPR.TECH	INS.MODE	OB CONTAINER ID	OB CONTAINER PARENT ID	OB ID	OBS TARG NAME
☒		Header	1999-09-28	HE2217-2818	00:41:46.94 -33:39:09.7	320.031768 -83.152062	60.A-9022(A)	UVES.1999-09-28T07:29:53.688	60.002	CALIB	STD	ECHELLE	DICHR#1			-1	LTT377
☒		Header	2000-03-13	STD	14:11:46.35 -33:03:14.0	321.754366 26.864670	60.A-9022(A)	UVES.2000-03-13T09:39:07.499	300.002	CALIB	STD	ECHELLE	DICHR#1			200006146	C-32d9927

☒		Header	2025-06-18	STD	16:23:34.16 -39:13:49.0	341.532387 7.249488	60.A-9800(D)	UVES.2025-06-18T23:12:50.185	299.999	CALIB	STD	ECHELLE	DICHR#2			3318550	EG274	FREE
☒		Header	2025-07-01	STD	12:57:02.28 +22:01:49.0	317.250578 84.745633	60.A-9800(D)	UVES.2025-07-01T22:56:23.946	300.000	CALIB	STD	ECHELLE	DICHR#1			3373037	GD153	FREE

☒ Request marked datasets ☐ Request marked datasets (old way)

A total of 2998 records were found matching the provided criteria.

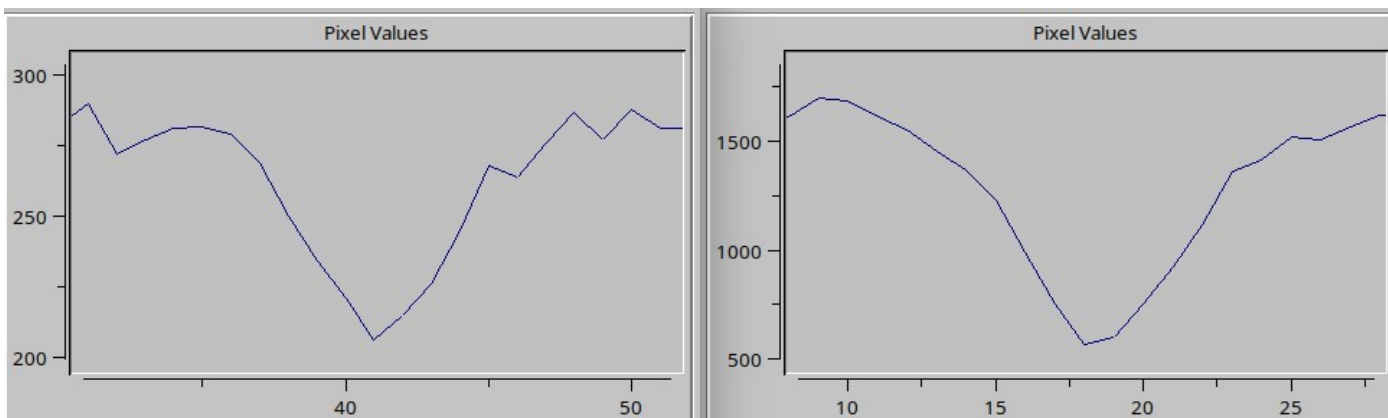
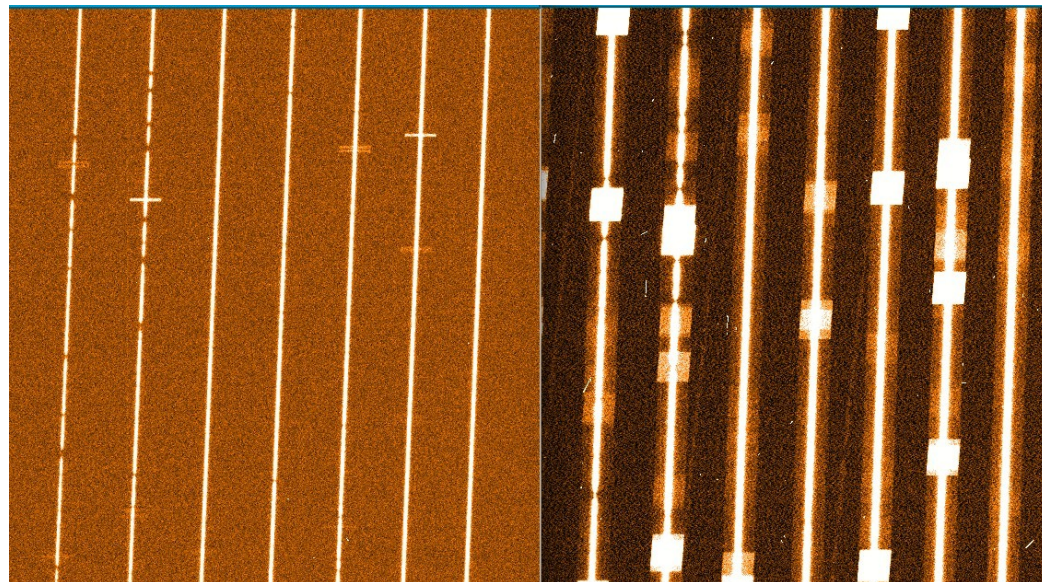
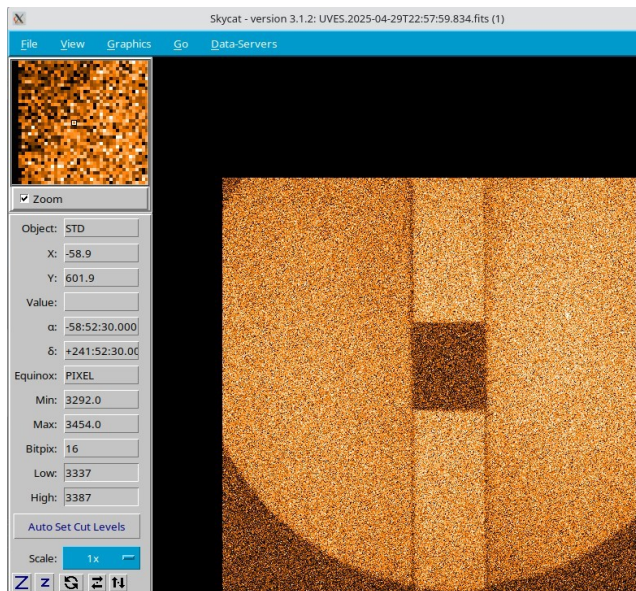


UVES white dwarf and sub dwarf spectrophotometric standards. Many stars with fewer observations not shown in this table.

Star	Spectral Type	m(V)	Dist. (pc)	Time on Source (h) 390 nm, 860 nm settings	Number of observations
EG 21	DA 3.0	11.39	10.4	33, 67	428, 436
EG 274	DA 2.0	11.03	12.9	27, 64	411, 420
LTT 3218	DA 5.5	11.85	8.5	46, 97	606, 620
Feige 110	sd0	11.50	270	30, 57	381, 367



UVES spectrophotometric standards – data taken with a wide slit (RH plot) so **minimum** spectral resolving power is low as seen by broad sky lines



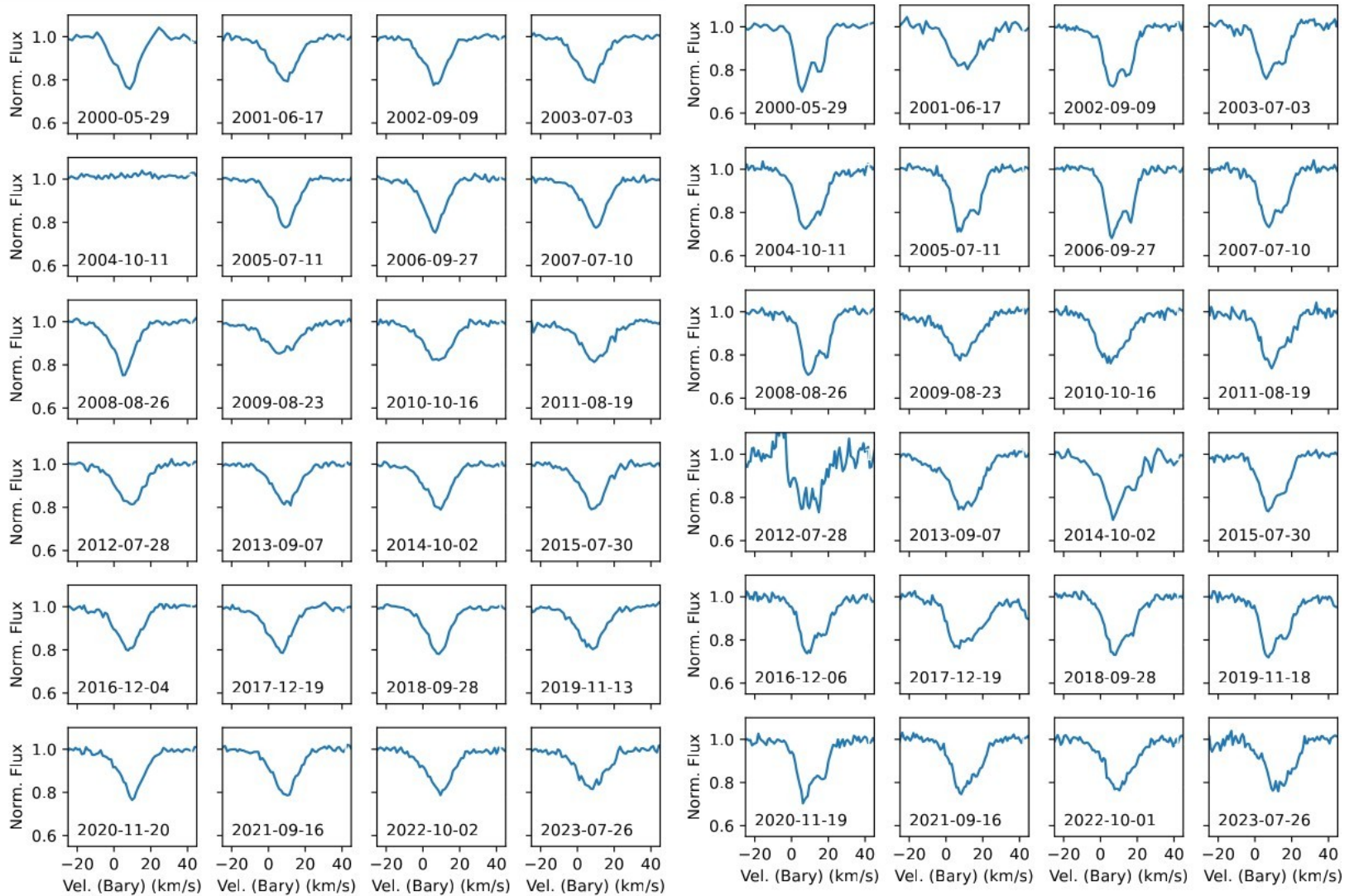
Telluric line in the spectral direction. Left 1.0'' slit. Right 10.0'' slit. The spectral resolving power is similar in both cases as the seeing was around 1''



However, the spectral resolution is set by the seeing for objects that don't fill the slit:

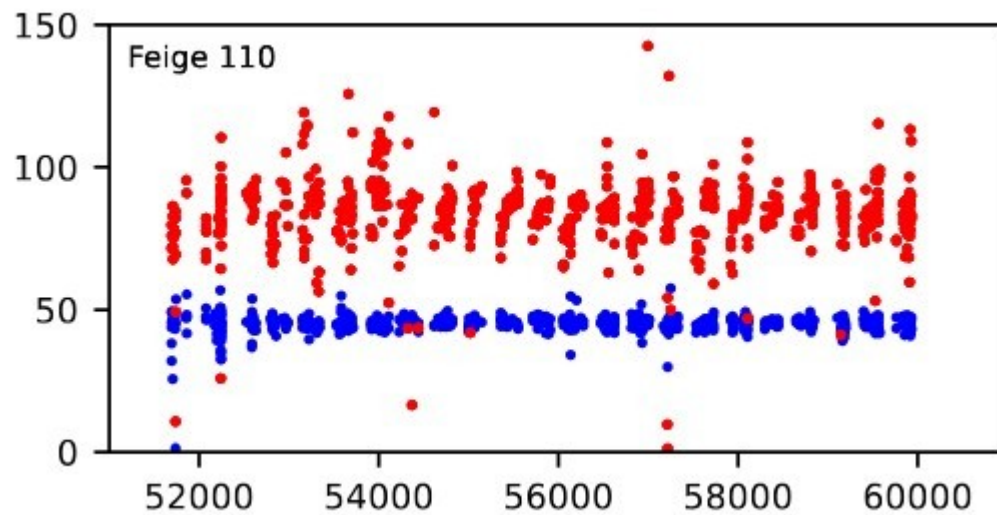


Feige 110 (sd0 not WD!) CaK (left) and NaD (right) profiles from 2000 to 2023. Only a handful of spectra shown. We use Feige 110 as a control star. $D=270$ pc.



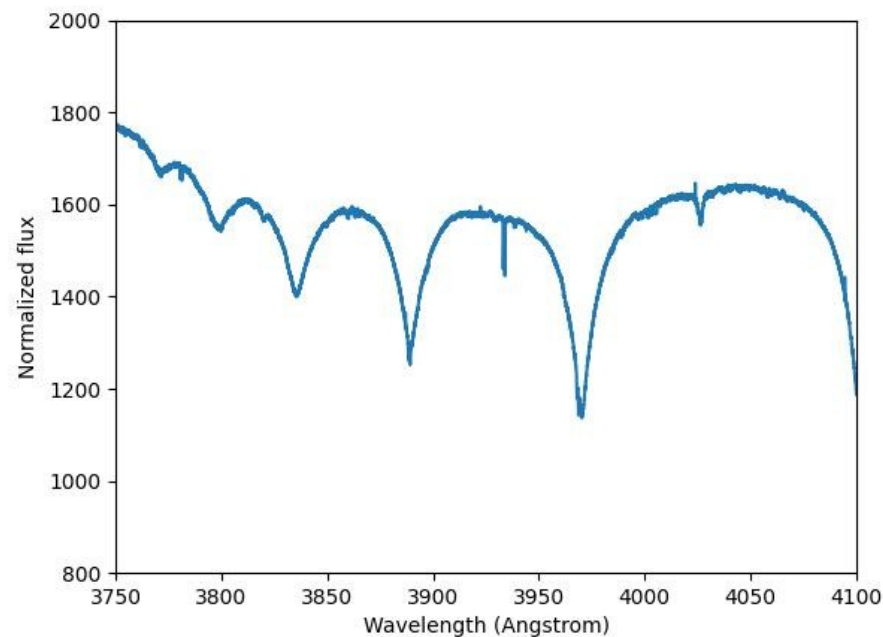
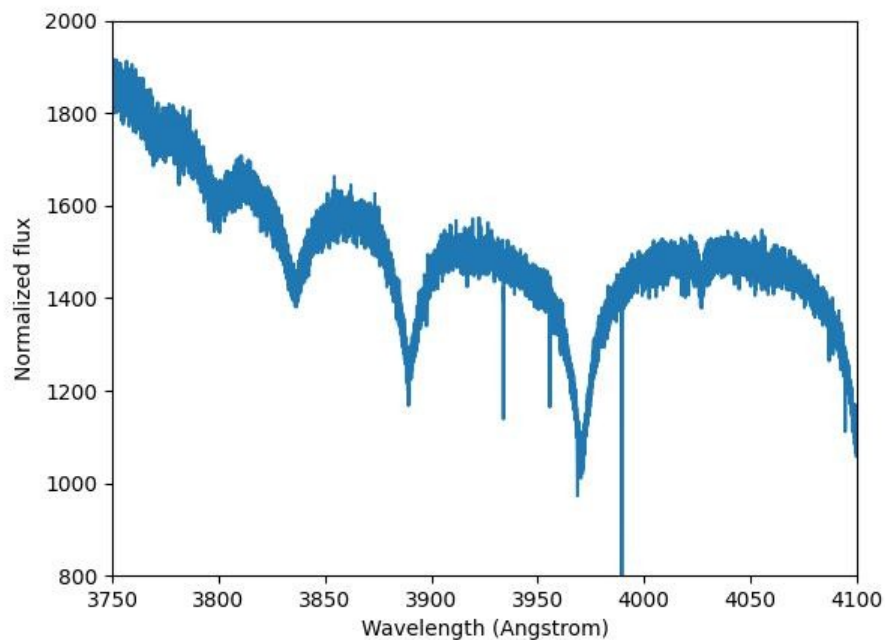


Feige 110 (sd0 not WD!) CaK and NaD equivalent width not corrected for telluric lines



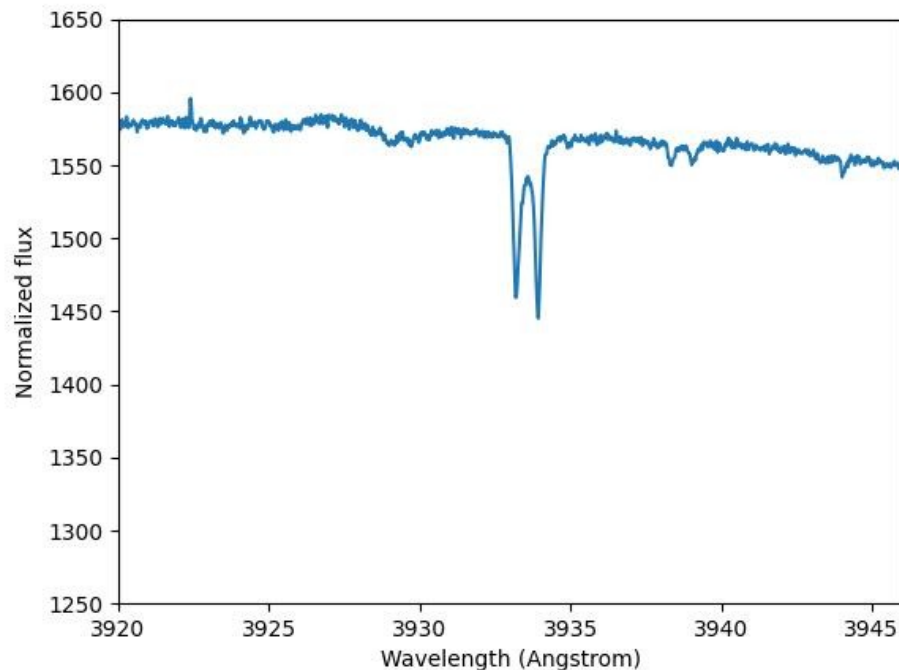
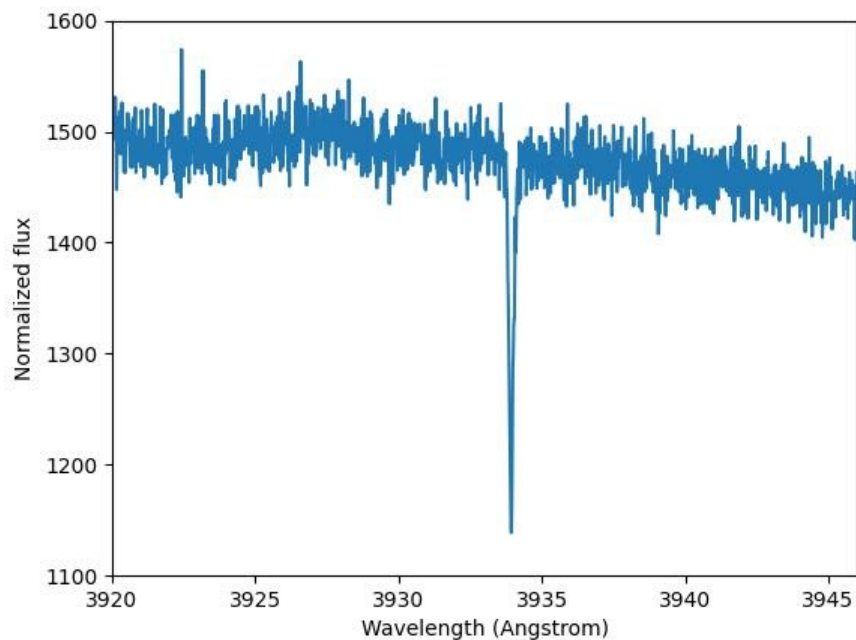


Feige 110 (sd0 not WD!) single spectrum (left) S/N ratio about 50. Combined spectrum (right) S/N of around 1000.



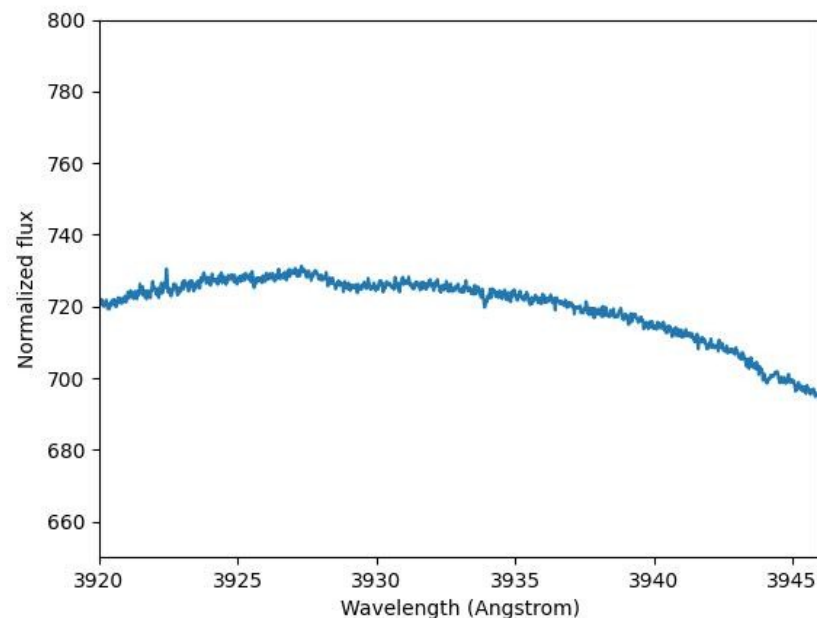
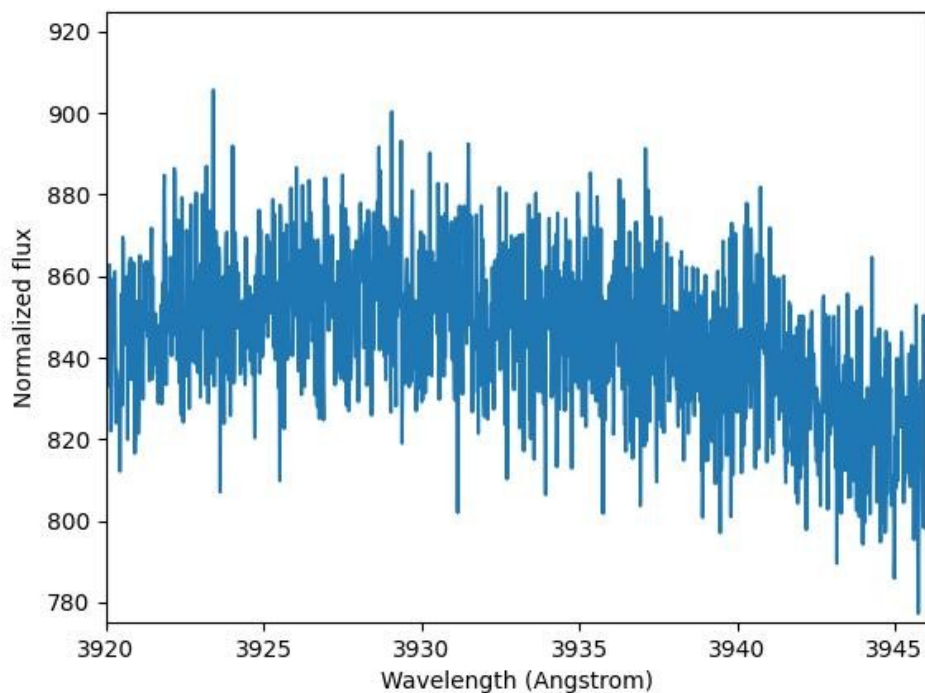


Feige 110 (sd0 not WD!) single spectrum (left) S/N ratio about 50 around CaK. Combined spectrum (right) S/N of around 1000. Not Heliocentric corrected.



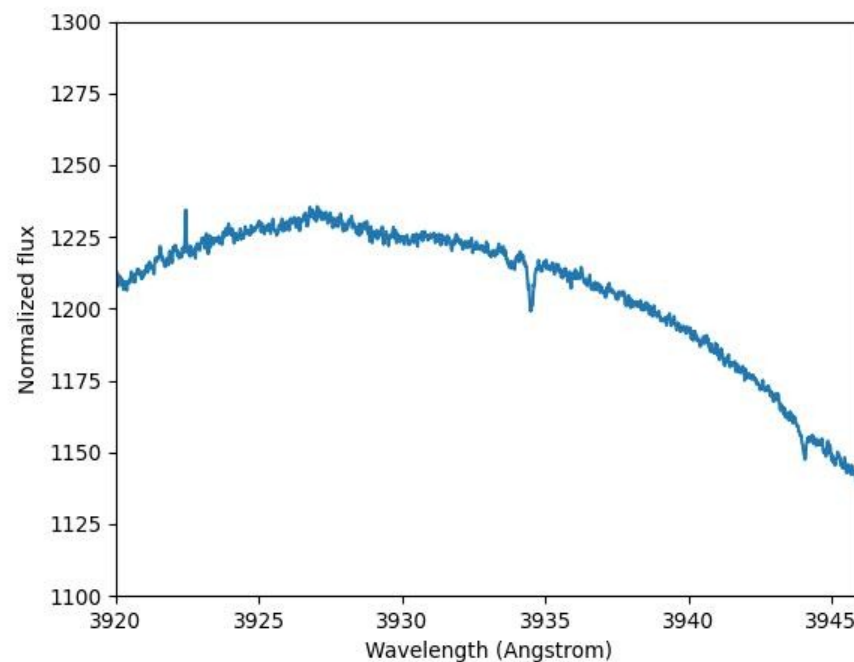
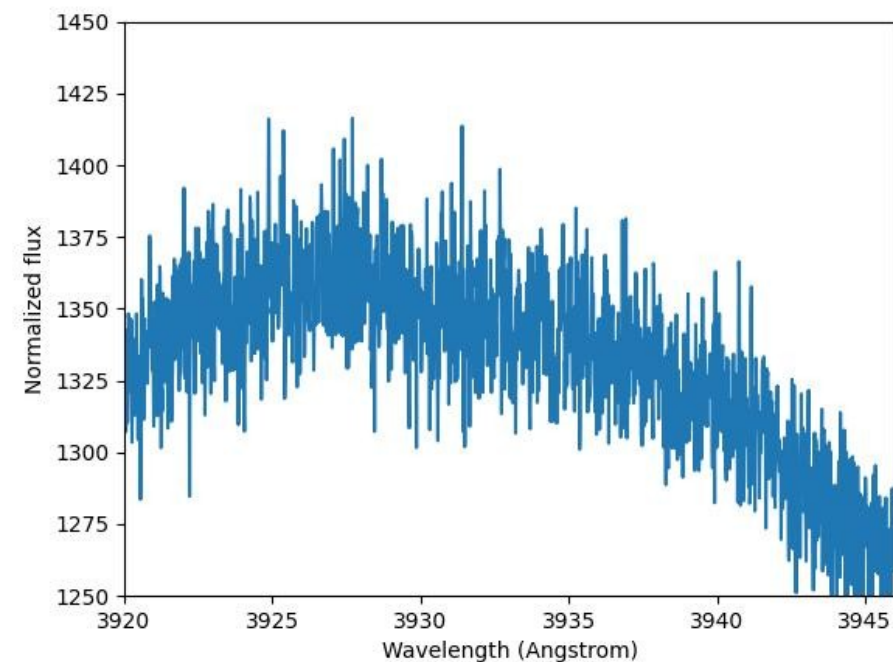


LTT 3218 WD single spectrum (left) S/N ratio about 40 around CaK. Combined spectrum (right) S/N of around 1000. Not Heliocentric corrected.



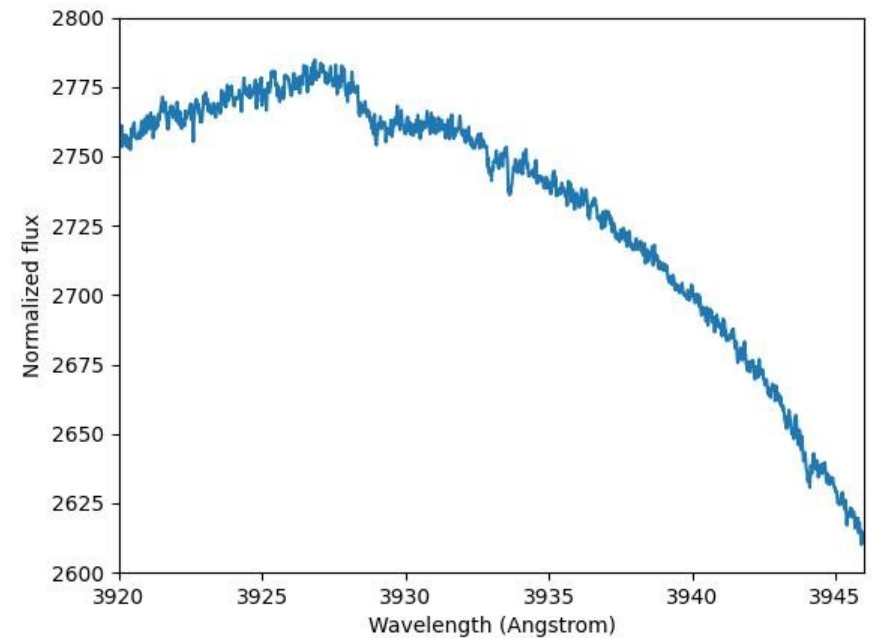
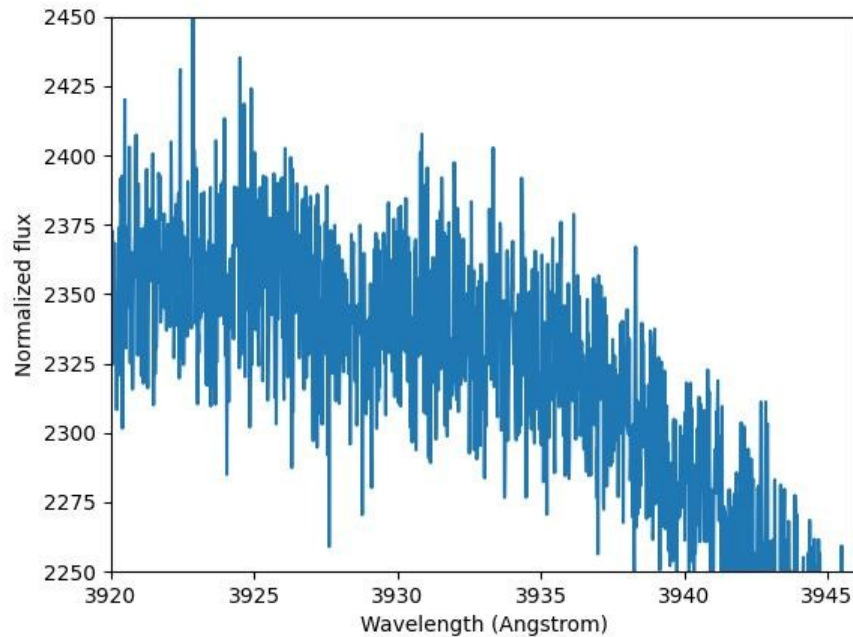


EG 21 WD single spectrum (left) S/N ratio about 40 around CaK. Combined spectrum (right) S/N of around 1000. Not Heliocentric corrected.





EG 274 WD single spectrum (left) S/N ratio about 40 around CaK. Combined spectrum (right) S/N of around 1000. Not Heliocentric corrected.





Conclusions and future work

- The SD star Feige110 has ($D=270\text{pc}$) has obvious CaK absorption.
- The three WD stars with distances of around 10 pc show tentative indications of CaK absorption, either from the stars themselves, circumstellar material or the ISM.
- Simple follow up is to apply the Heliocentric correction to see if the lines are real. Other elements will also be Studied (CaH, NaD, DIBs etc).
- Then the time variability aspect will be investigated, in particular with regards to possible planetary debris in exoplanets around white dwarfs.



The ESO studentship

ESO: opportunities for collaboration at ESO Chile

The ESO-Chile studentship

The ESO-Chile studentship receives PhD students enrolled in a PhD programme at institutes from around the world. Students come to ESO to work on a specific research project with an ESO supervisor (staff and/or fellow), with significant opportunities to work on observatory projects/learn about observatory operations/life...

Call for applications twice per year (April and October)

~4-6 positions open at each call (11 positions in total)

Studentships can be between six months to two years

Students are expected to work on short observatory projects (one-two weeks)



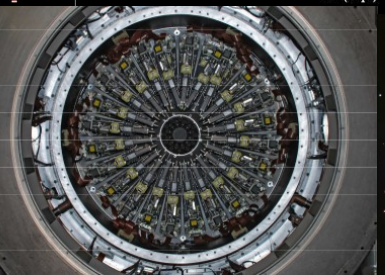
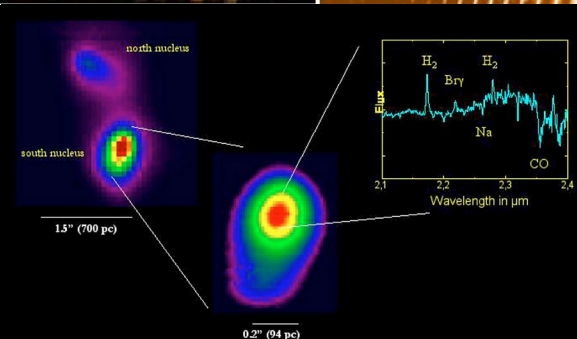
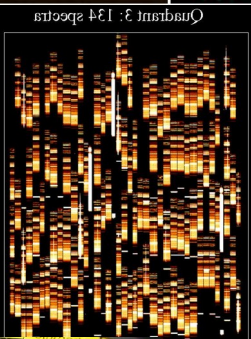
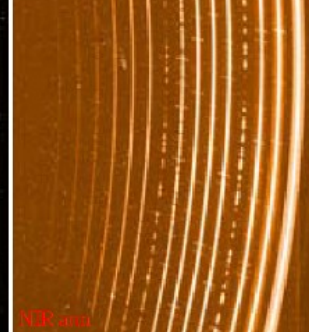
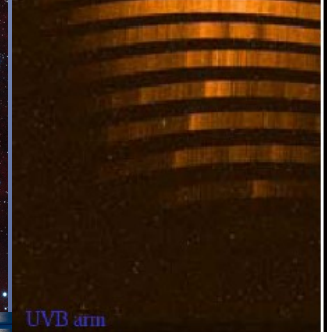
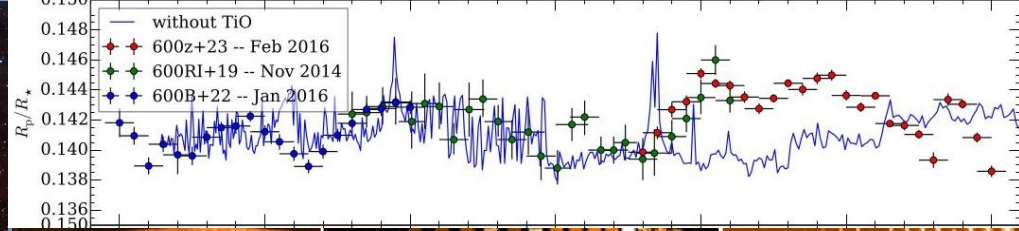
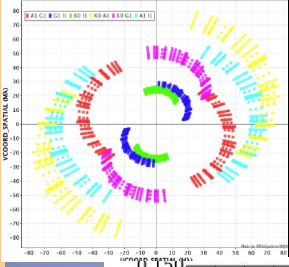
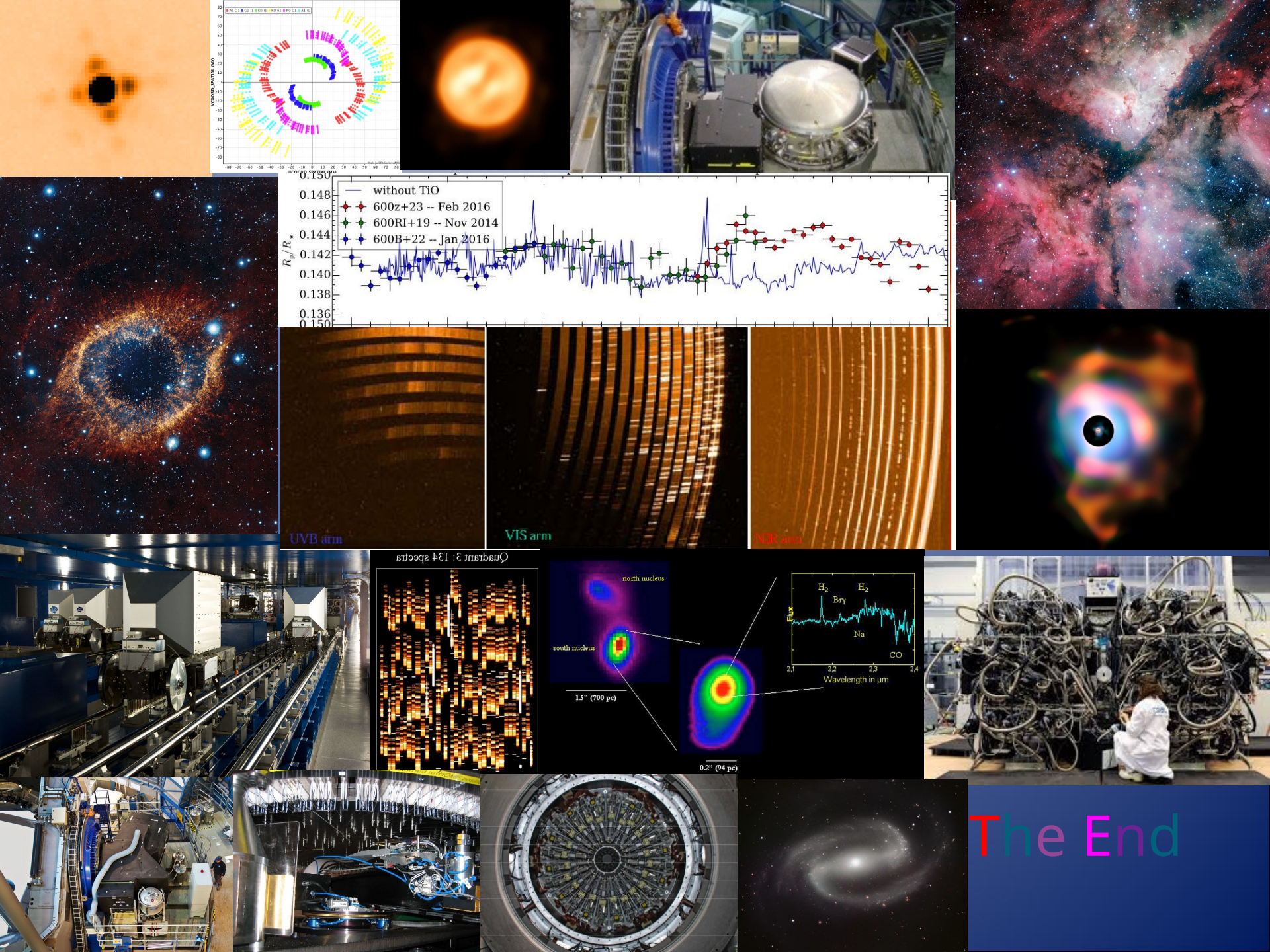
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Application deadline: 30 April and 30 October, each year



The End