

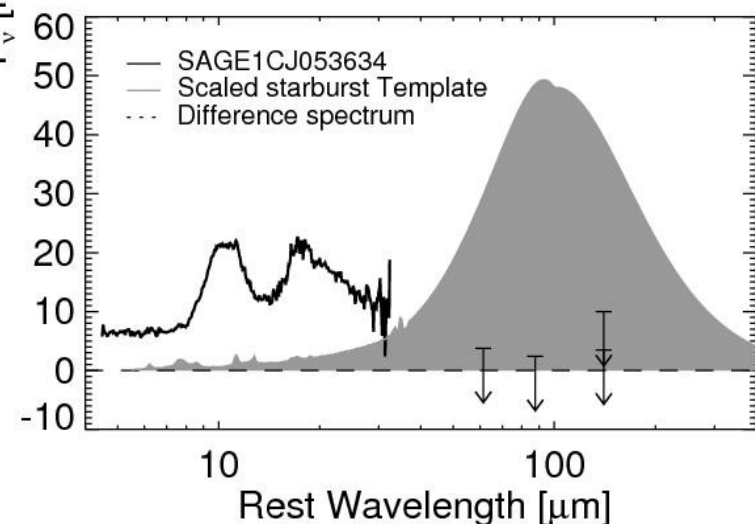
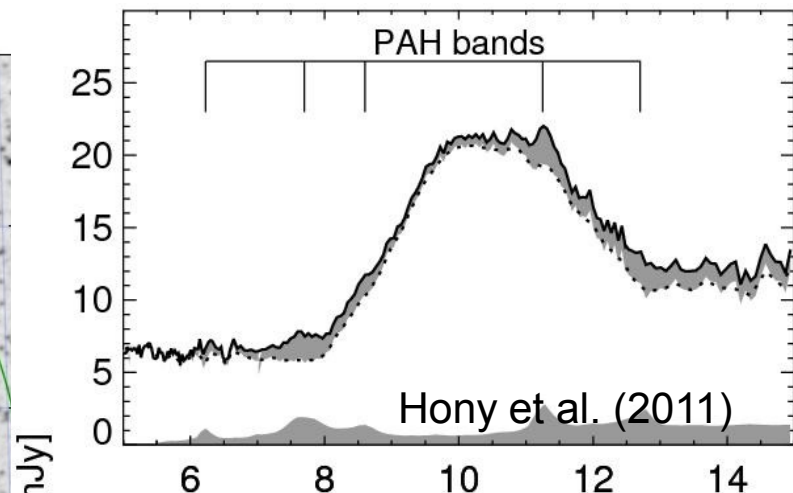
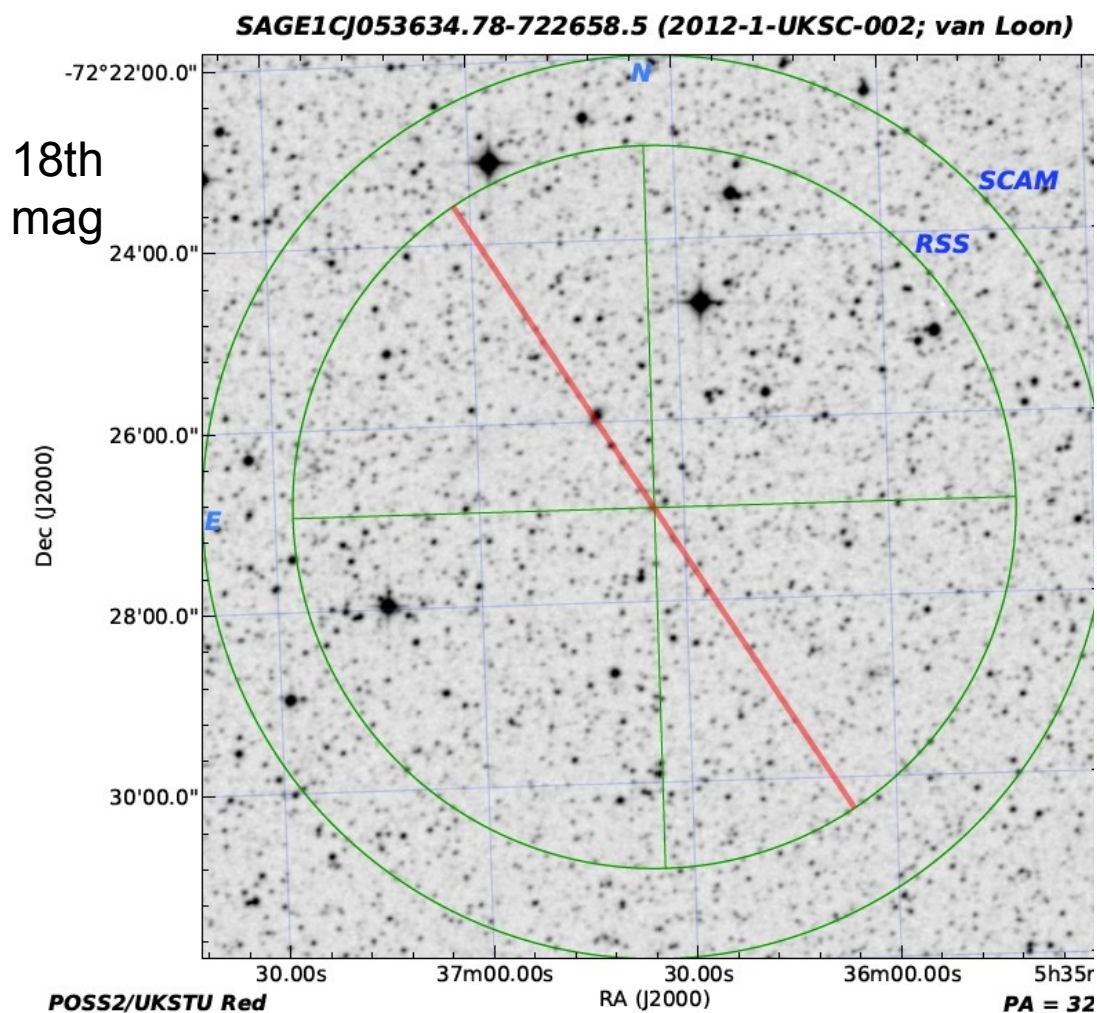
A long-exposure photograph of a night sky showing star trails as concentric circles. In the foreground, a building with a large dome and a tall chimney is visible, illuminated from within. The sky is dark blue and black, with the star trails in shades of white and blue.

UKSC SALT programmes

Some recent highlights, data and results
2013 May

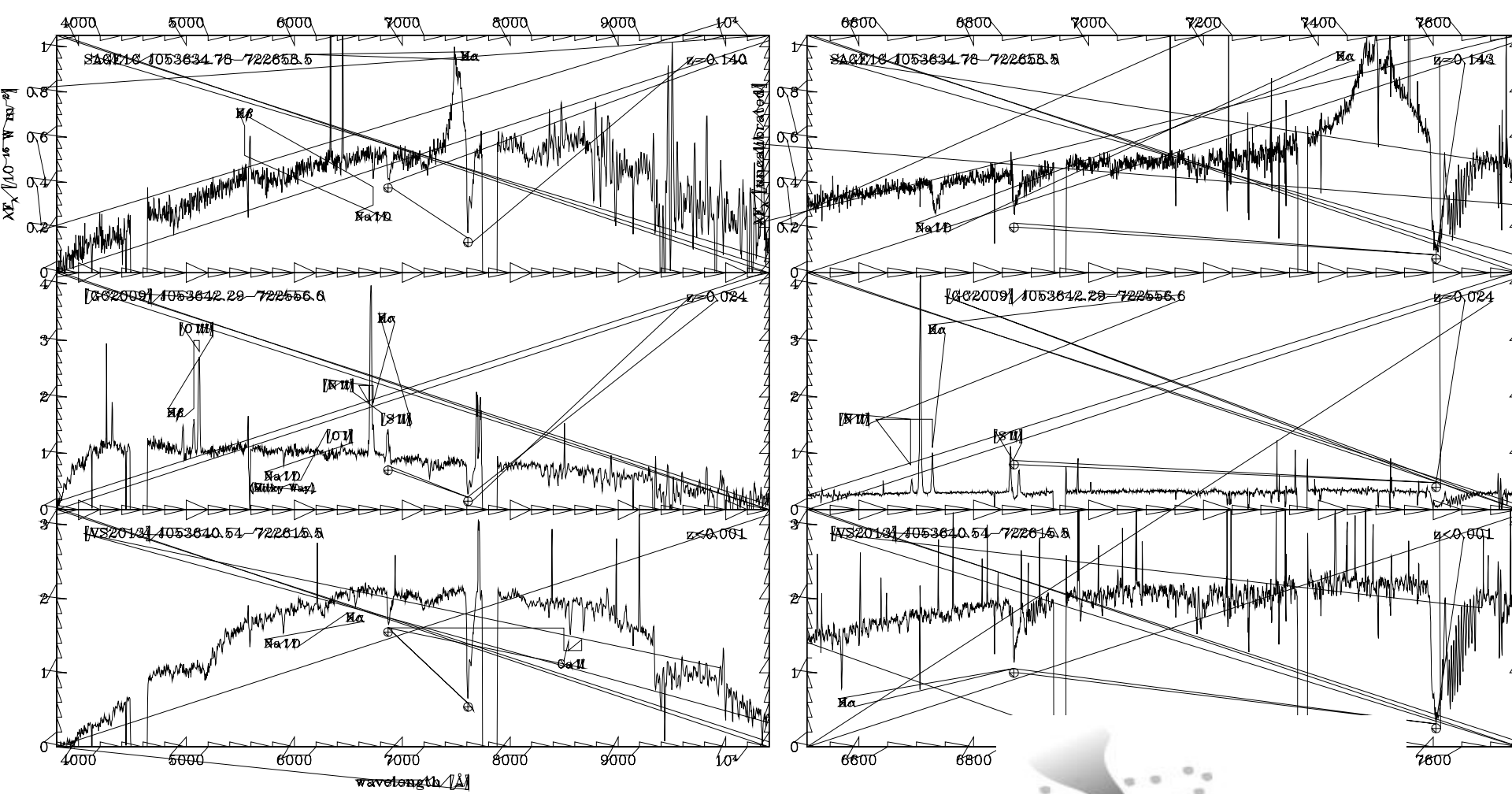
Jacco van Loon (Keele) + Anne Sansom (UCLan)

Optical spectra of an AGN found serendipitously behind the LMC, of which the IR emission is dominated by the dust torus

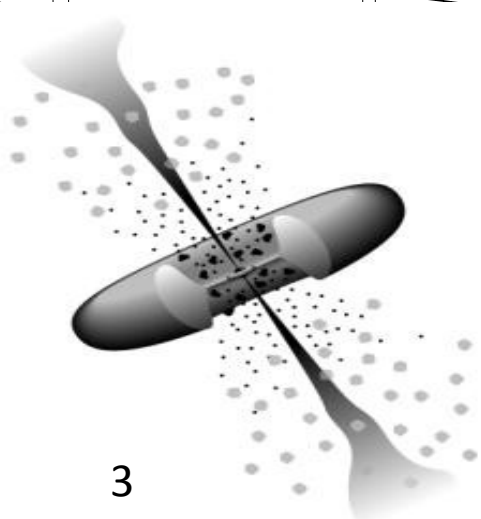


2013 May 22

SALT Science Workshop,
Warsaw (GEB)



- redshift $z=0.143$ (Mg II 2800 Å shifts to 3200 Å)
- broad H α (~5000 km/s); weak narrow-line region (H α + [NII])
- elliptical galaxy host? More medium-resolution spectra...
- serendipitous Spitzer discovery (Grundl & Chu 2009): spiral
- foreground interstellar sodium absorption (spatial variations)



Pierre Maxted (Keele)

MUCHFUSS

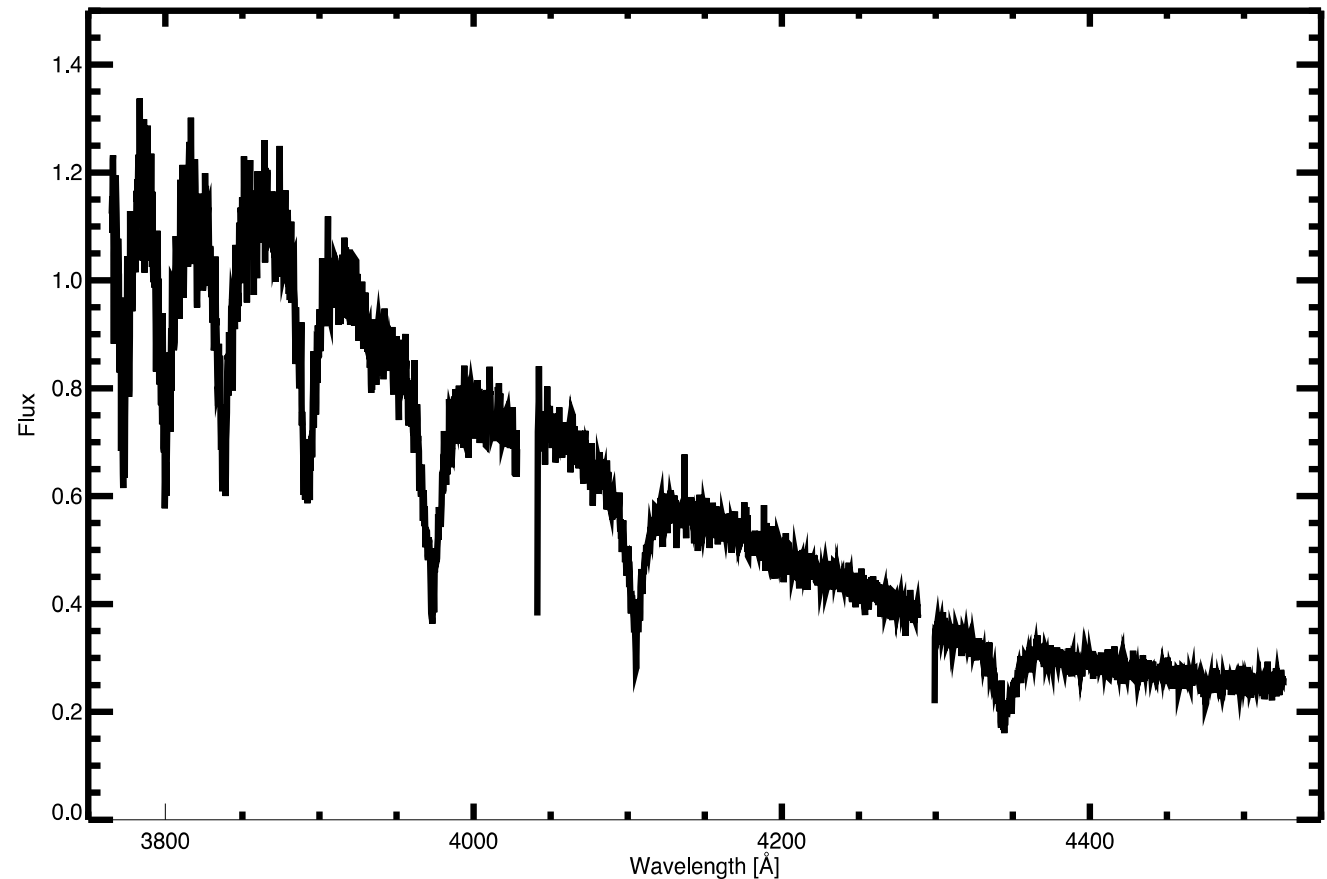
- **Massive Unseen Companions to Hot Faint Under-luminous Stars from SDSS**
- Follow-up spectroscopy of faint blue stars from SDSS with large radial velocities
- Main targets are subdwarf-B stars with massive companions (SNe-Ia progenitors?)
- Also find hypervelocity stars escaping the galaxy.



MUCHFUSS SALT spectrum of J131619

- $T_{\text{exp}} = 1340 \text{ s}$, $V=16.4 \text{ mag}$
- Radial velocity $\pm 5 \text{ km/s}$; constant \Rightarrow hypervelocity star
- Proper motion $V_{r,\text{gal}}=250 \text{ km/s}$ suggests origin near Galactic Centre.
- Star ejected from the Galaxy by ...

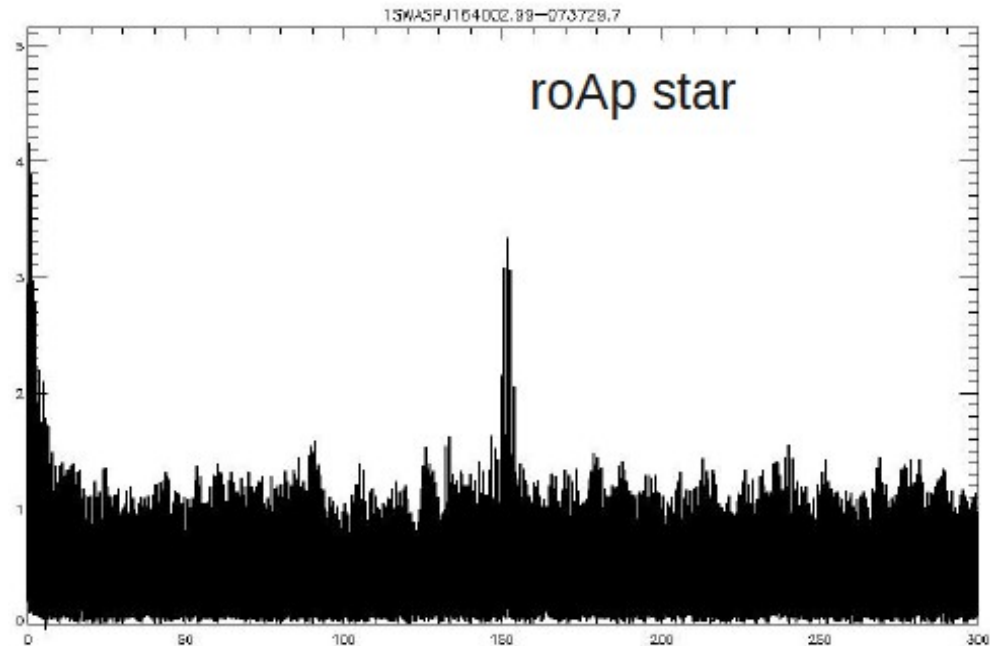
- ejection from binary with a supernov a
- binary disruption near central SMBH



Daniel Holdsworth & Barry Smalley (Keele)

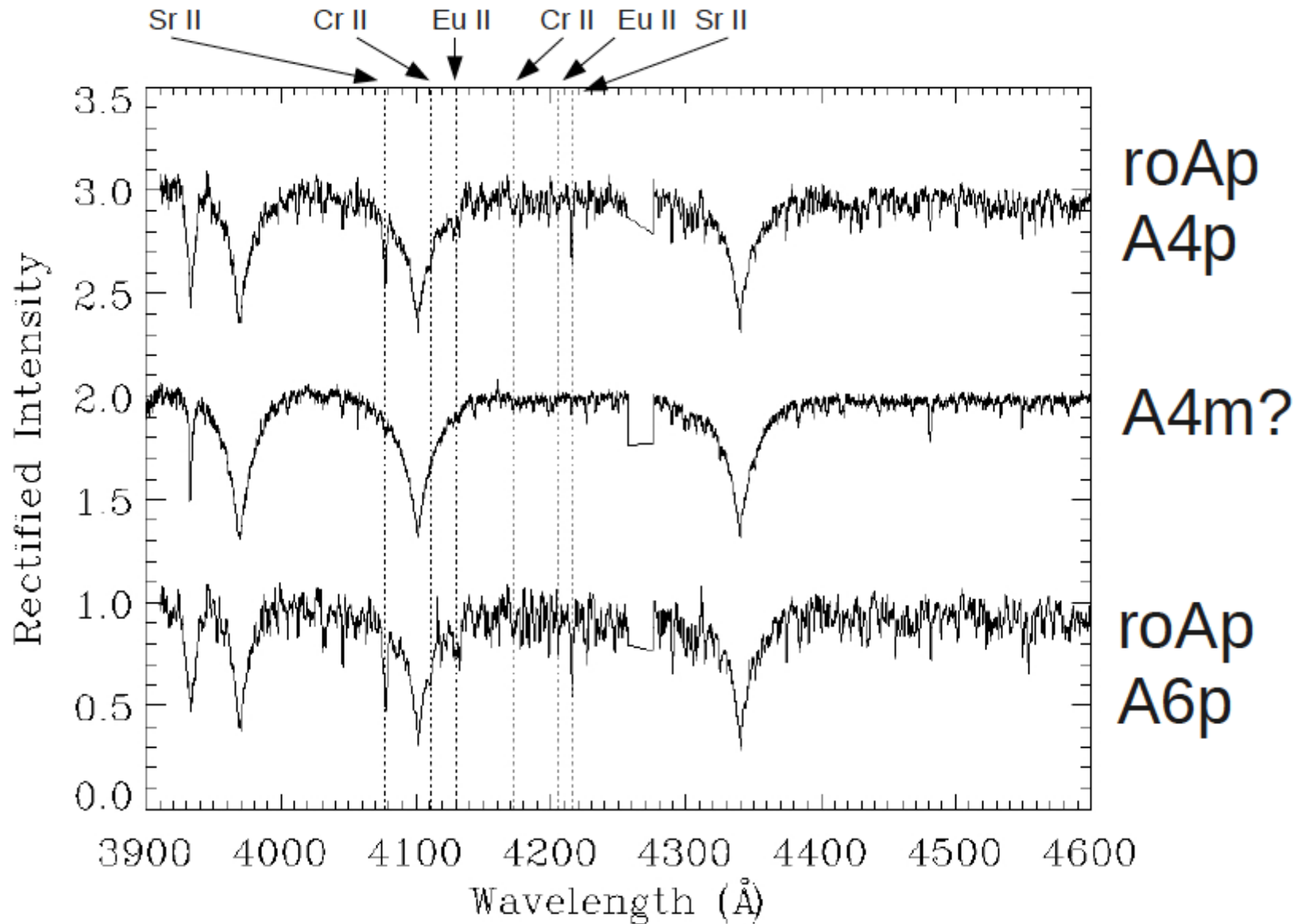
Characterising rapidly varying A-type stars

- Rapidly oscillating Ap stars:
 - ~50 known to date
 - Tests for interactions between pulsations and magnetic fields
- Search WASP archive for rapid variability:
 - > 1.5 million A-type stars and earlier
- Determine upper frequency limit for δ Scuti stars:
 - currently ~80 cycles/day



- 38 candidate roAp stars with period < 24 min
- > 200 stars of δ Scuti type:
 - some in the region of 100 cycles/day
- at least one new sdB pulsator:
 - 7 mmag at 625 cycles/day (2.3 min period!)

SALT spectra of rapidly varying A-type stars



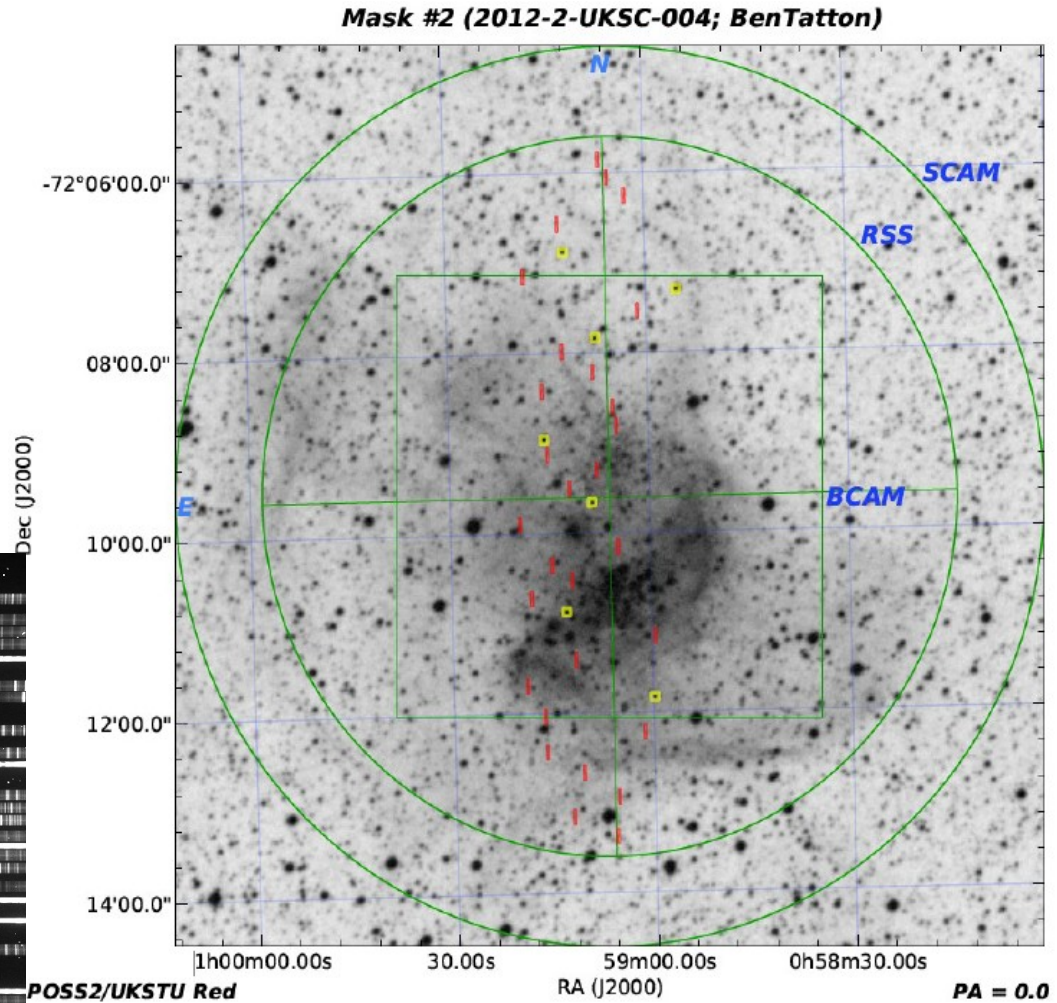
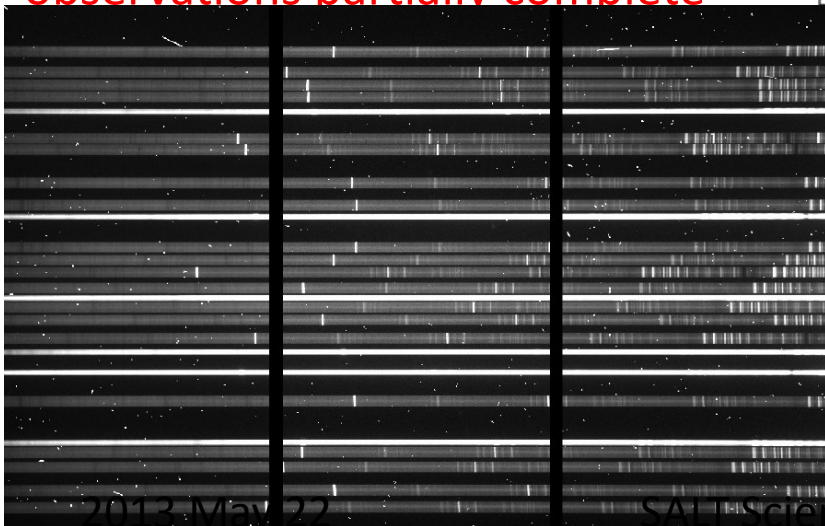
25 targets observed so far (11 with RSS): 2 confirmed to be roAp; 4 possibly Am

Ben Tatton & Jacco van Loon (Keele)

Validating techniques to map the star formation history, chemical enrichment and structure of galaxies

- low/medium resolution spectra
 - Teff (± 200 K)
 - metallicity (± 0.1 dex)
- 76 red clump stars
- 3 fields (2 LMC, 1 SMC)

observations partially complete



SALT results from the Open University

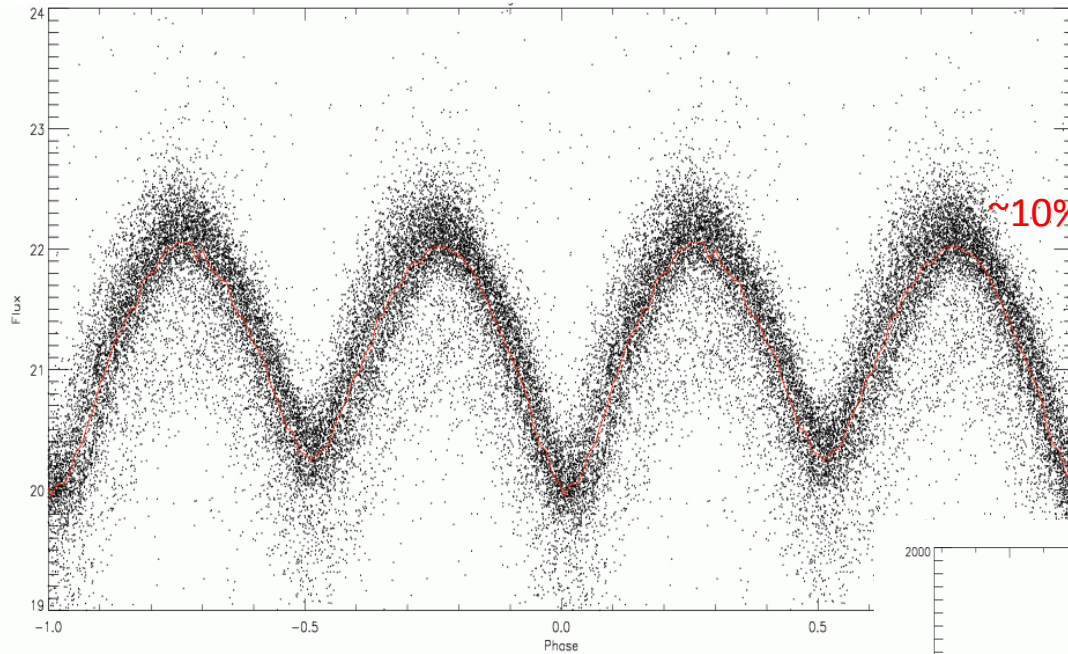
Programme: 2012-1-UKSC-007

“An eclipsing binary at the period cut-off with a short merger timescale: measuring stellar parameters” (Paper in preparation)

Andrew Norton & Marcus Lohr

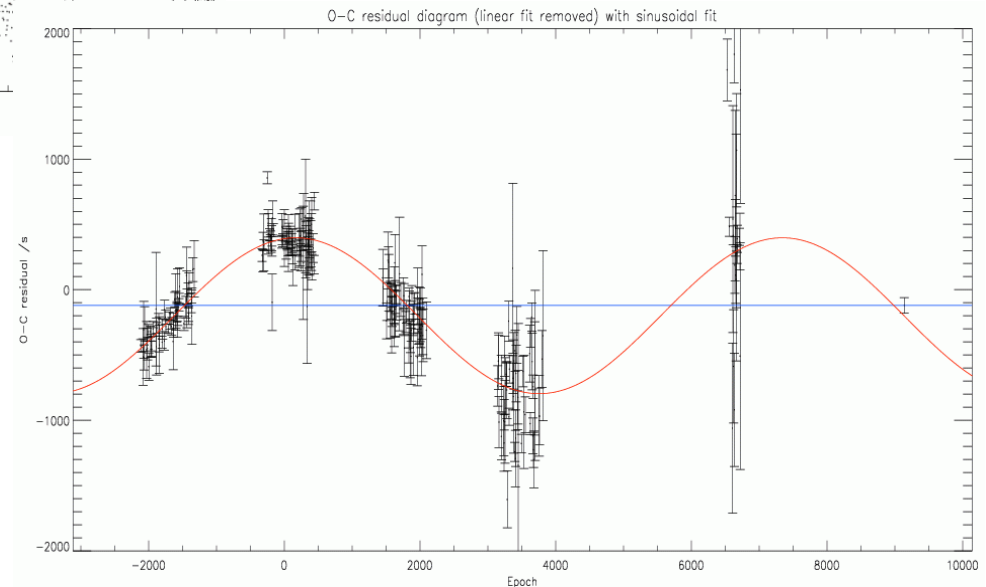
Department of Physical Sciences, The Open University, U.K.

“An eclipsing binary at the period cut-off with a short merger timescale: measuring stellar parameters”

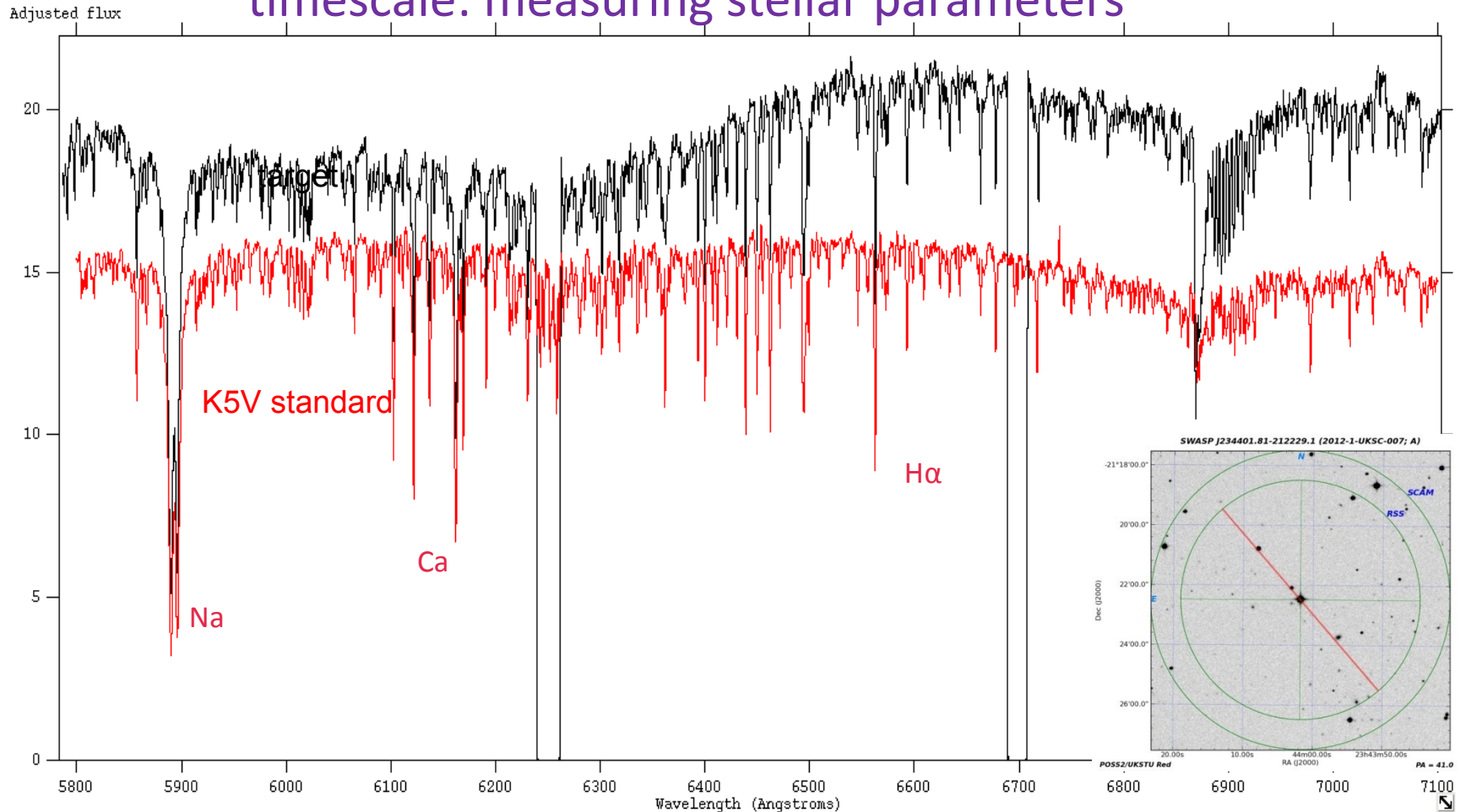


SuperWASP data on J234401 reveals 5.1h modulation of a contact binary.

Initially seen to show 0.3 s/yr period decrease; now displays ~4 yr cyclic variation in O-C diagram of eclipse timing.



“An eclipsing binary at the period cut-off with a short merger timescale: measuring stellar parameters”



3.25 blocks of data obtained in May/July/August 2012.

Good quality spectra – flat-fielding also successfully done.

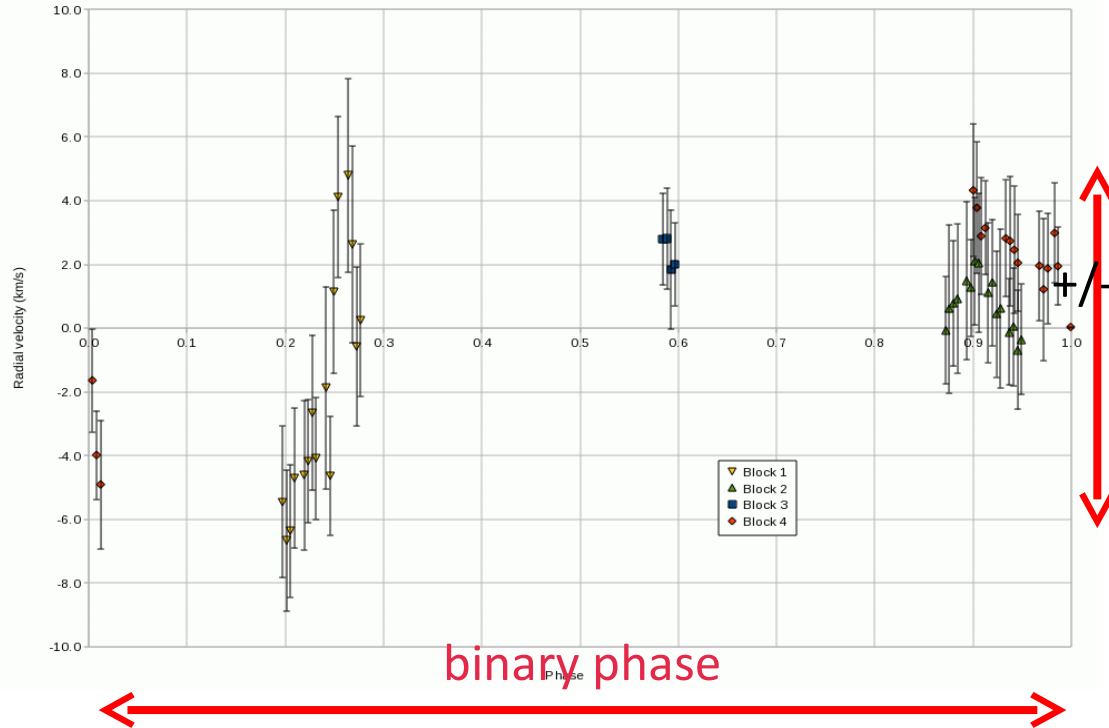
All spectra show good match with K5V star.

2013 May 22

SALT Science Workshop,
Warsaw (GEB)

11

“An eclipsing binary at the period cut-off with a short merger timescale: measuring stellar parameters”



BUT:

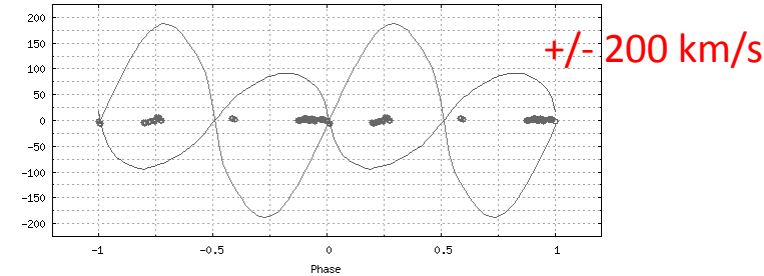
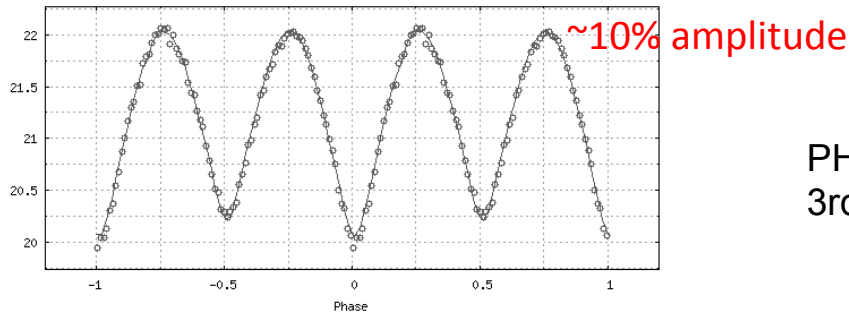
NO line splitting –
NO significant radial
velocity shifts seen
from cross-correlation

***NO evidence for the
presence of an
eclipsing binary star!***

There is no way to reconcile both the photometry and the radial velocity spectroscopy assuming any binary star model (e.g. high inclination / extreme mass ratio)

“An eclipsing binary at the period cut-off with a short merger timescale: measuring stellar parameters”

What's going on?



PHOEBE model is well-fit to photometry assuming 3rd source of light from K5V star, but no match to RV

Best guess – triple system: K5V + M3V/M7V

Contact binary M3V/M7V contributes 10% of the light to photometry

Possibly in a ~4yr orbit with K5V star that dominates spectrum

By subtracting a template K5V spectrum from the SALT spectra, and cross-correlating the residuals with respect to those at phase 0, there are some hints of the expected Radial Velocities from the presumed eclipsing binary.

Mike Maxwell (UCLan)

Recurrent Nova T Pyx: the late decline phase (Nov 2012 – Feb 2013)

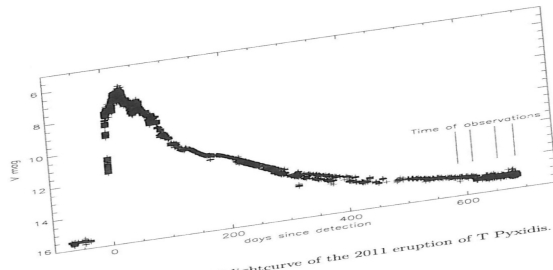


Figure 4.13: V band AAVSO lightcurve of the 2011 eruption of T Pyxidis.

106

CHAPTER 4

CHAPTER 4

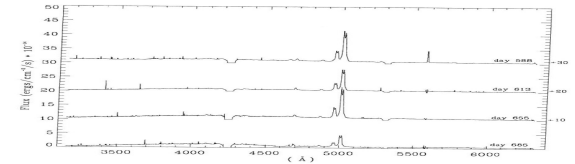


Figure 4.14: SALT spectra of T Pyx, offset as indicated to the right of the figure.

107

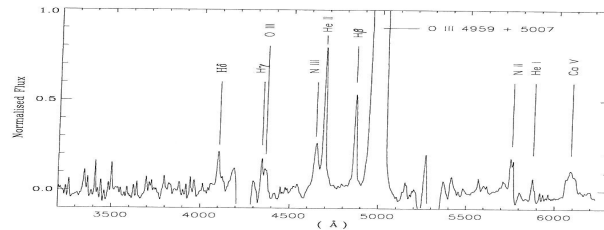


Figure 4.15: Averaged, flattened spectrum of T Pyx, smoothed with a Gaussian profile.

108

A long-exposure photograph of a night sky showing star trails as concentric circles. In the foreground, a building with a large dome and a tall, thin tower is visible, illuminated from within. The sky is dark, and the star trails are in shades of blue and white.

UKSC SALT programmes

Some recent highlights, data and results
2013 May