Studies of Emission-line stars and Nearby Galaxies with SALT

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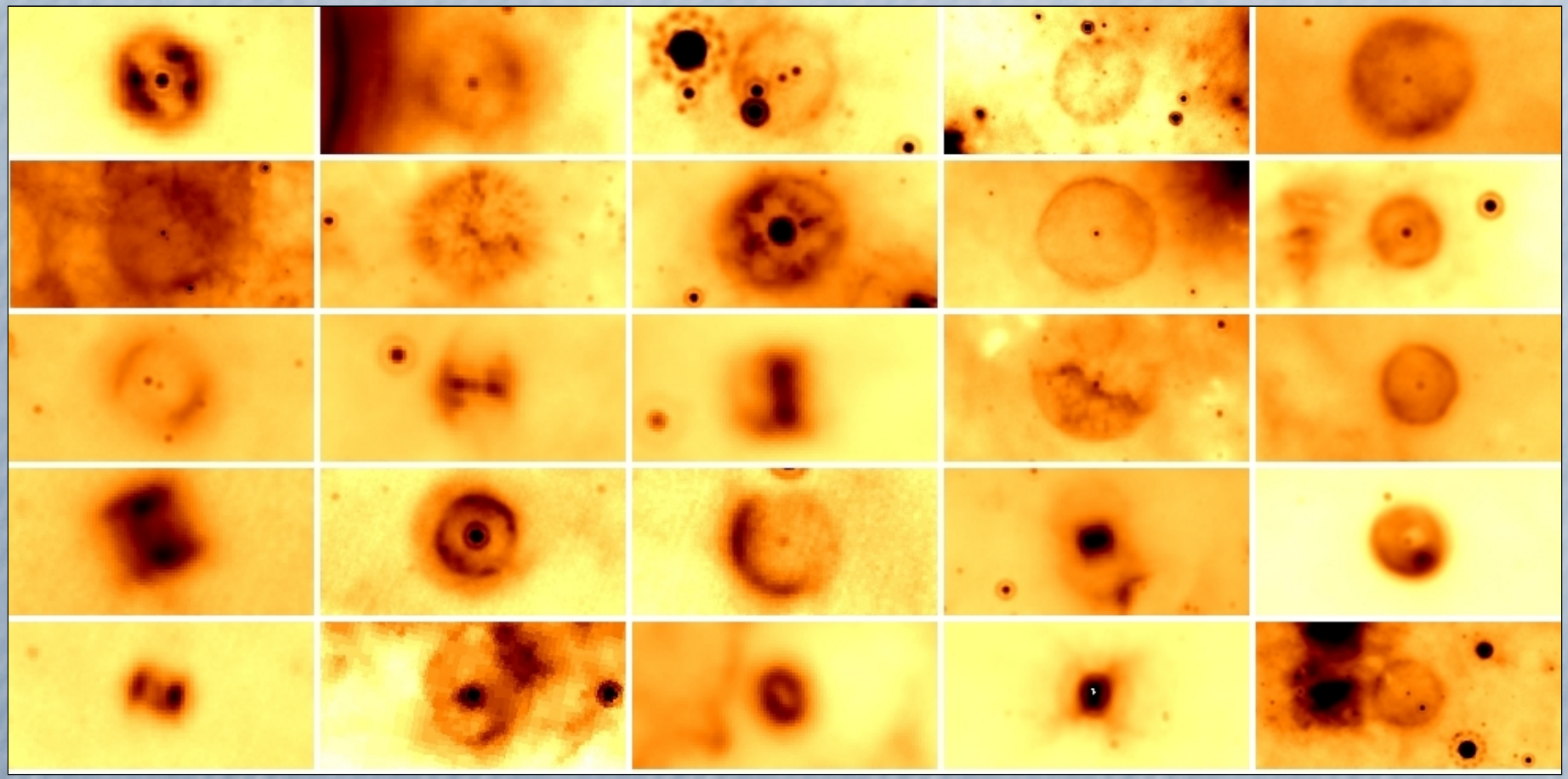
SALT Proposals:

1. Optical Spectroscopy of Stars With 24 Micron Shells: Search for New Luminous Blue Variables

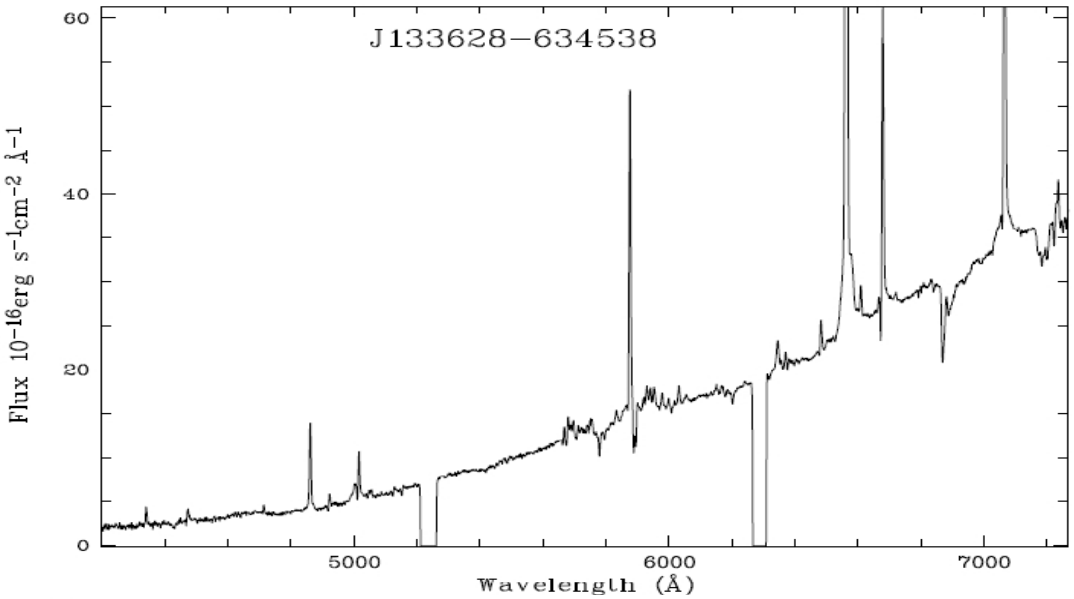
2. DDT proposal on determining the radial velocity for the Local Group suburb galaxy KK258 with SALT

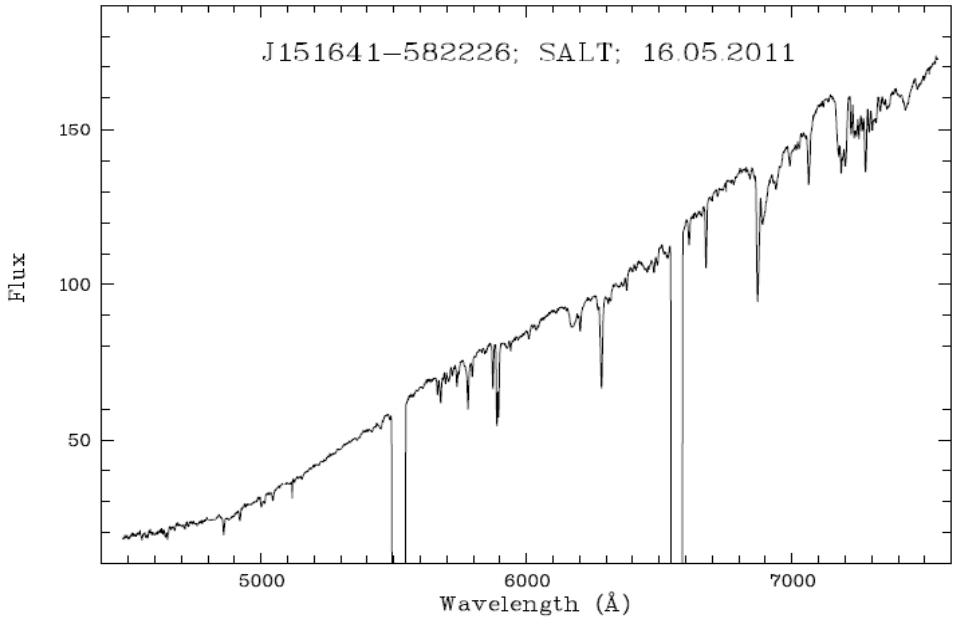
SALT spectroscopy of candidate evolved massive stars revealed with Spitzer and WISE

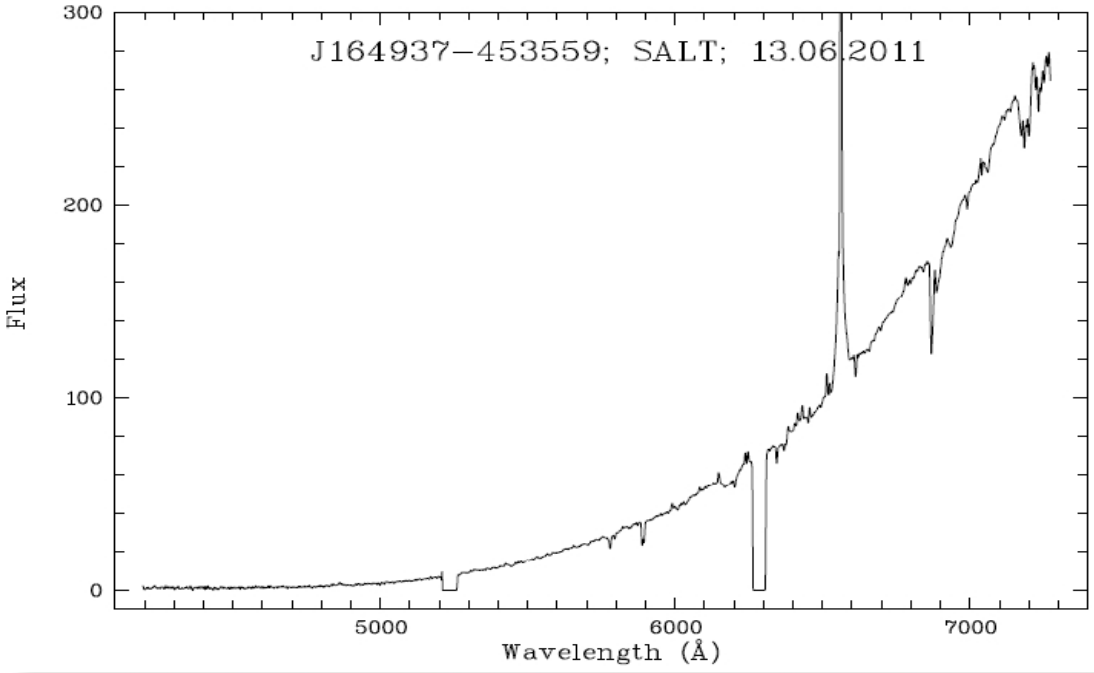


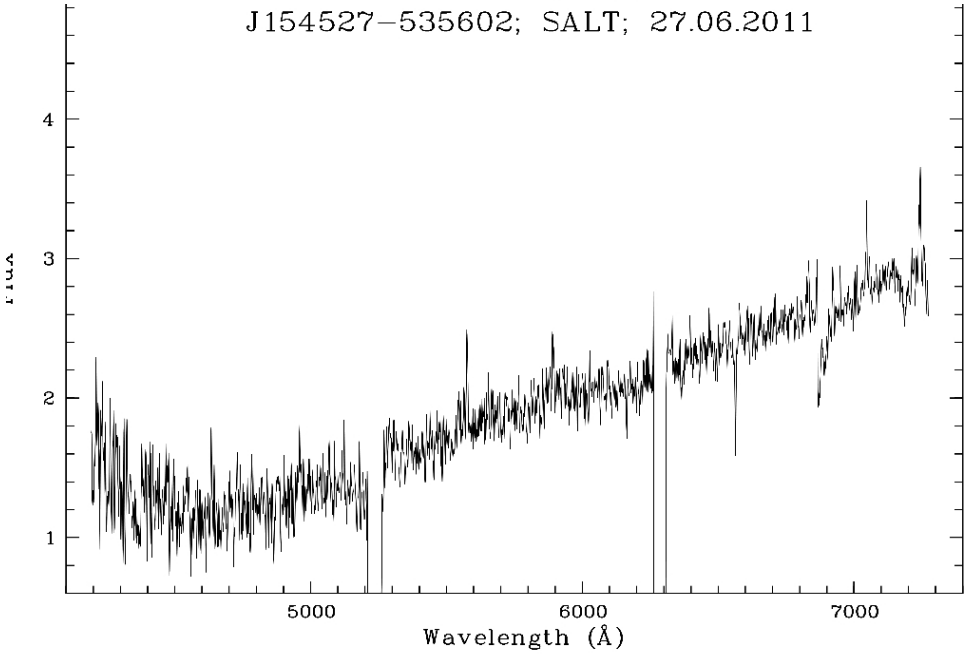
The list of found candidates was published in
Gvaramadze, Kniazev & Fabrika, 2010, MNRAS, 405, 1047

Altogether ~50 candidates were observed at SALT with different quality

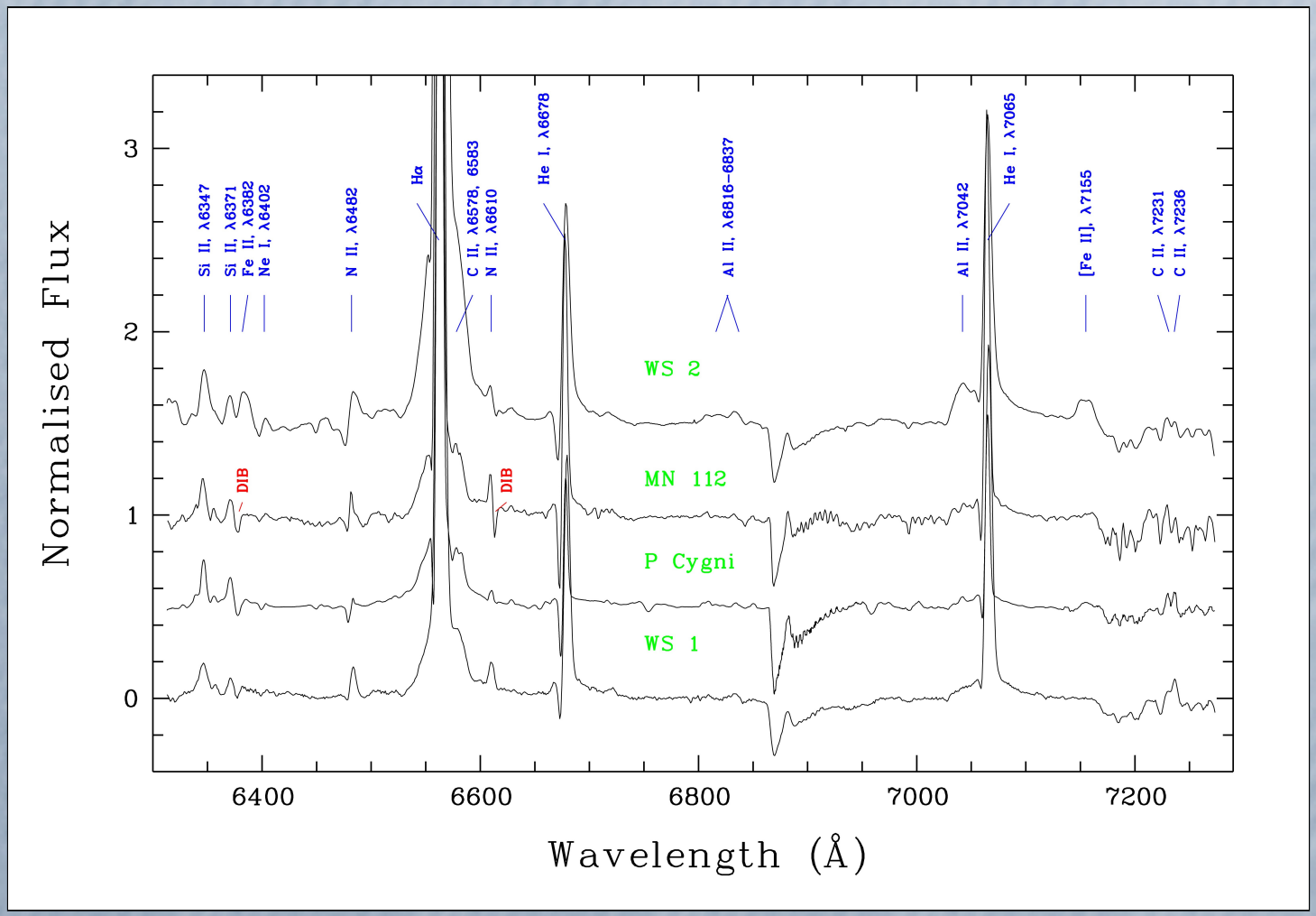






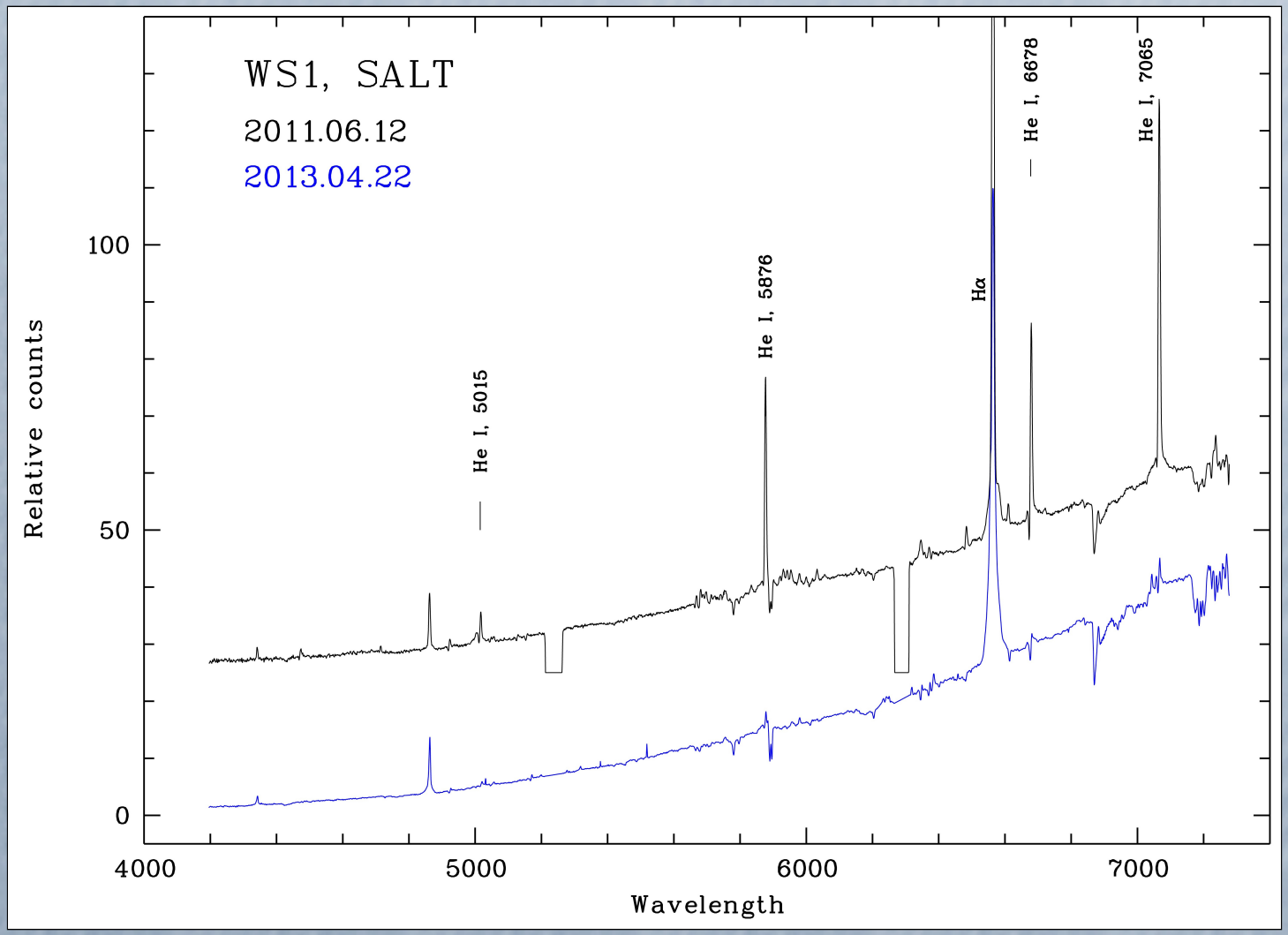


Discovery of two candidate LBV stars: WS1 and WS2



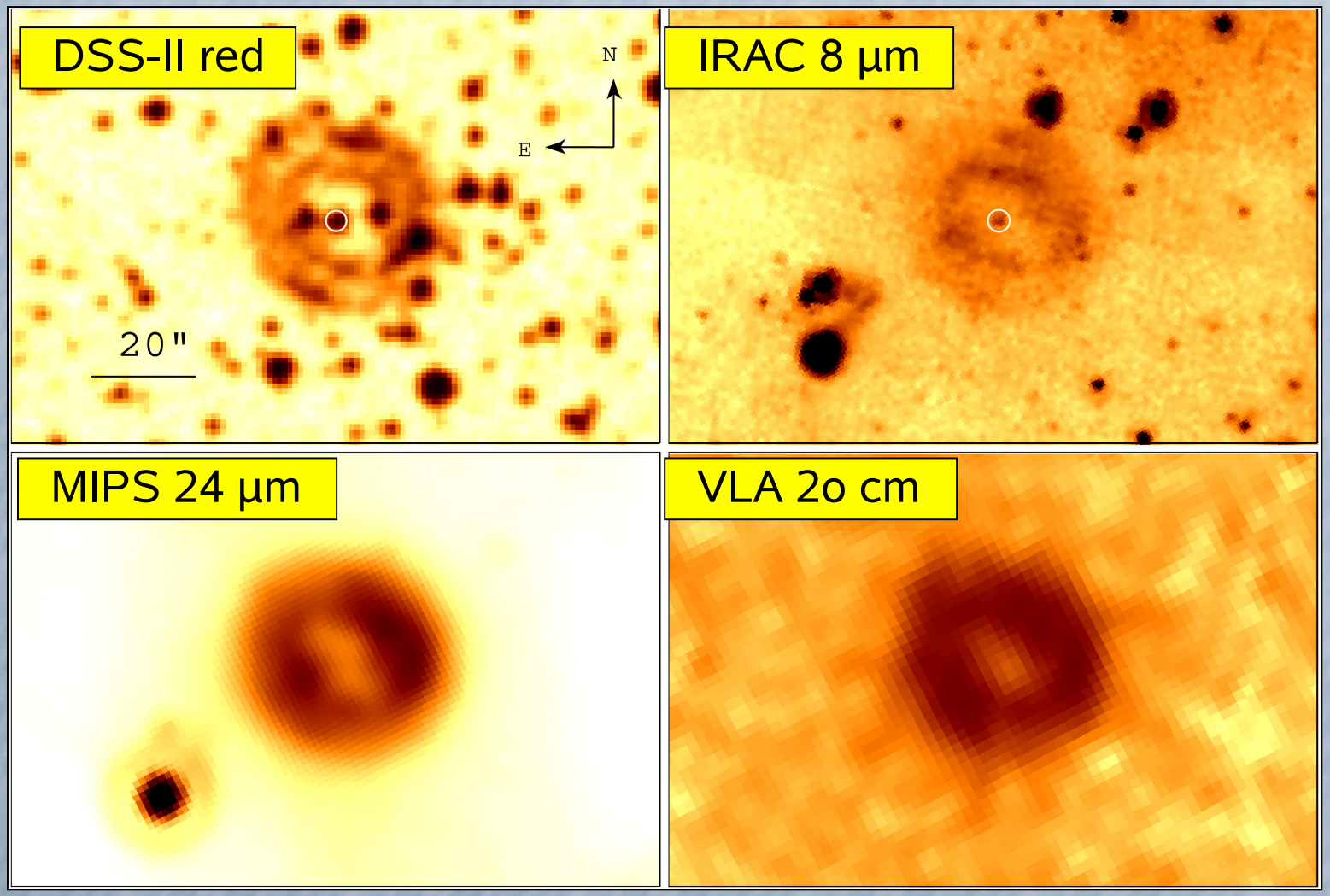
(Gvaramadze, Kniazev, et al., 2012, MNRAS, 421, 3325)

Observations with SALT in 2013 show that WS1 is a bona-fide LBV star!



Kniazev, et al., 2014, in preparation

Abell 48 – a rare WN-type central star of a planetary nebula (1)



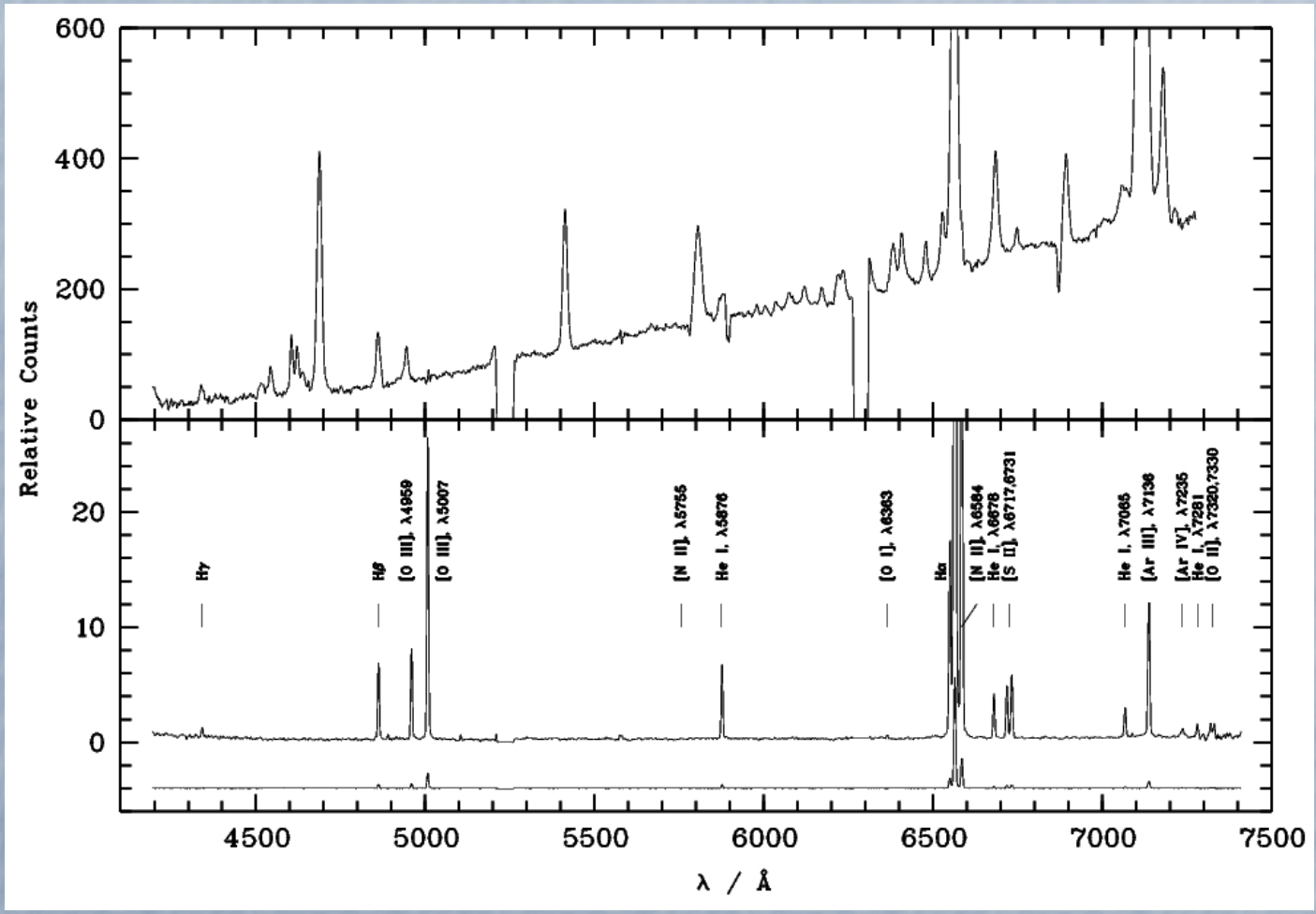
Object from our sample. Was observed with SALT.

Abell 48 – a rare WN-type central star of a planetary nebula (2)

Todt , Kniazev, et al., 2013, MNRAS, 430, 2302 :
In this work we reported the spectroscopic identification of rare [WN] star, the central star of Abell 48.

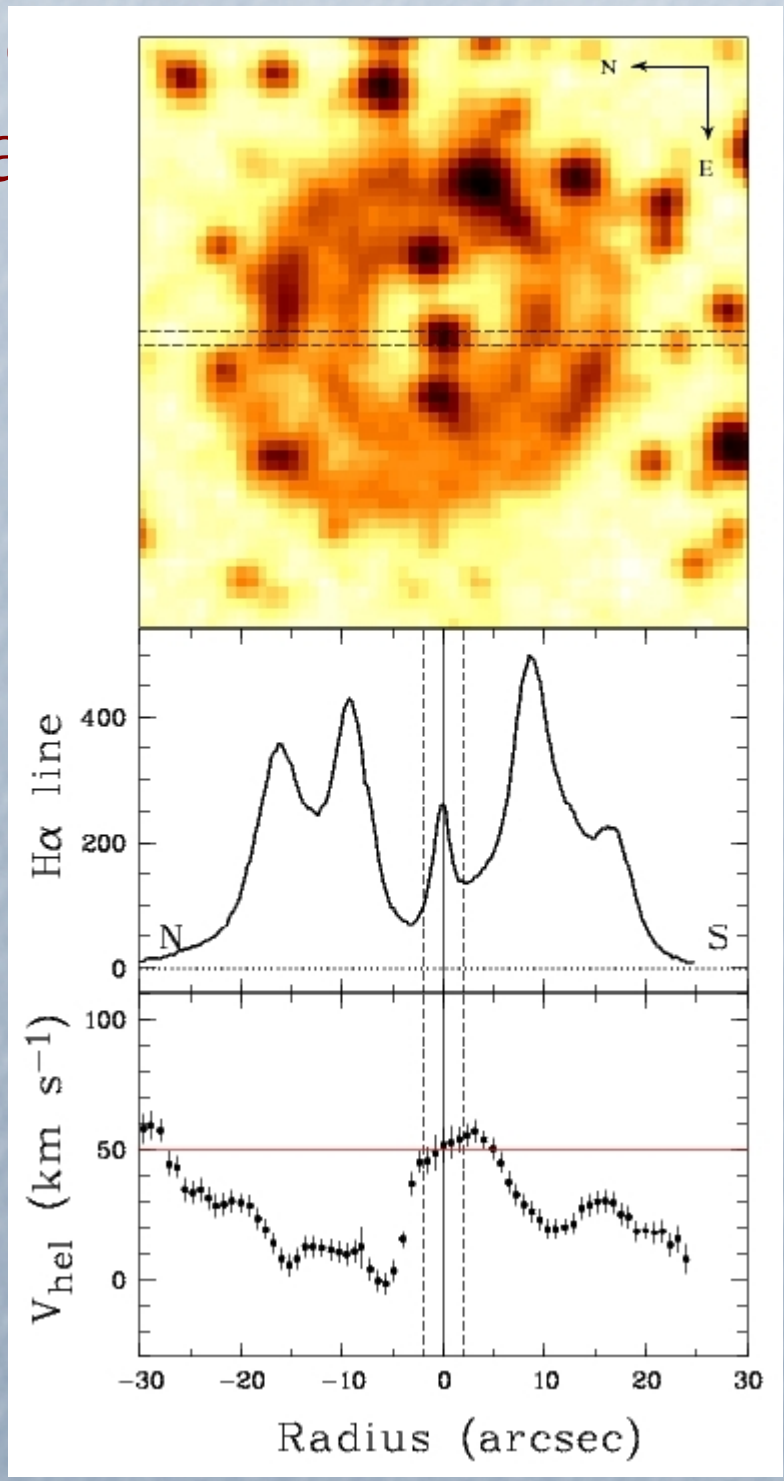
One-dimensional reduced spectra of the central star of Abell 48 (top) and nebula (bottom). The total exposure time is 3x900s.

Most of the detected strong emission lines of the nebula are marked.



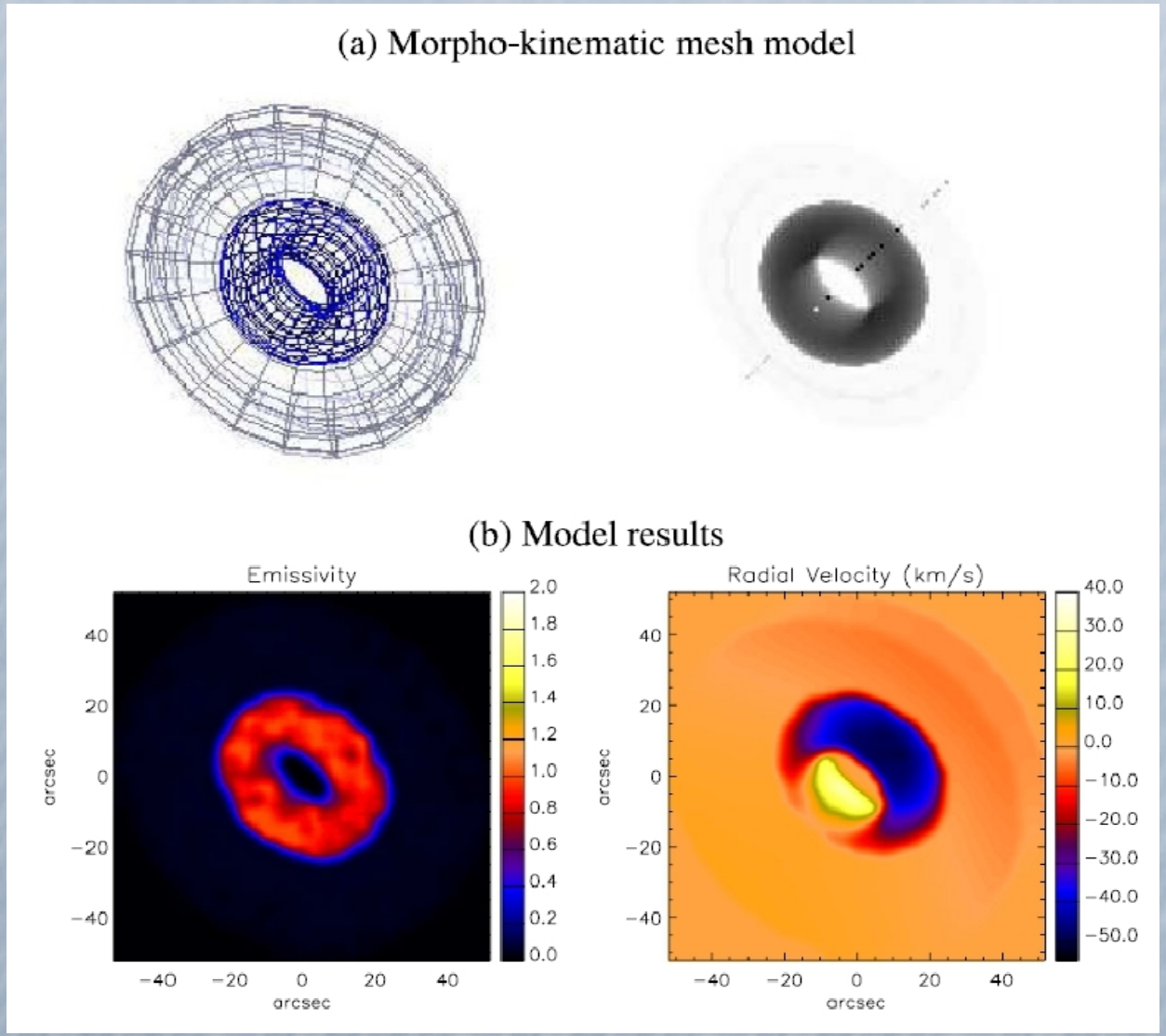
Abell 48 – a rare WN-type planetary nebula

Ha intensity and radial velocity distribution along the slit.
Upper panel: DSS-II red band image of Abell 48 with the position of the 1.25 arcsec slit shown by dashed lines.
Middle panel: The relative flux of the Ha-line along the slit after continuum subtraction. N-S direction of the slit is shown. The vertical line at r=0 corresponds to the position of the CS. The region r+/-2 arcsec is shown with vertical, dashed lines to mark the area, where the average velocity V_hel = 50.4 +/- 4.2 km/s was calculated.
Bottom panel: The velocity profile of the Ha line, corrected by using the night-sky line [OI] 6363 Å. The horizontal line indicates the calculated Velocity 50.4 km/s, that has to be close to the heliocentric velocity of the CS.



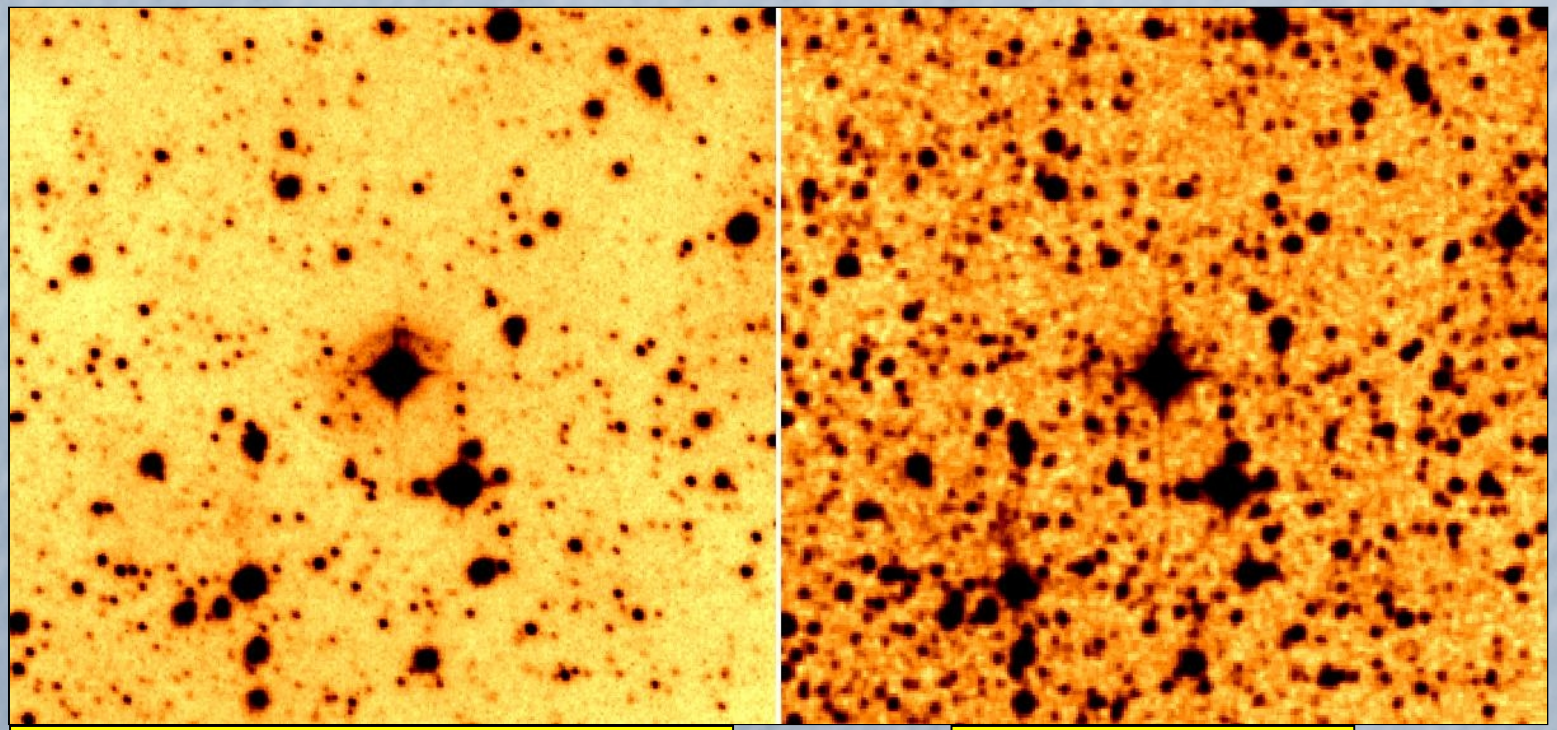
Three-dimensional photoionization modelling of the Wolf-Rayet planetary nebula Abell 48

The morpho-kinematic model of Abell 48 is shown in Figure, which consists of a modified torus, the nebular shell, surrounded by a modified hollow cylinder, and the faint outer halo. The shell has an inner radius of 10 arcsec and an outer radius of 23 arcsec and a height of 23 arcsec.
Our value of the LSR systemic velocity is in good agreement with the heliocentric systemic velocity of V_hel = 50.4 ± 4.2 km/s found in our previous work.



(Danekhar, Todt, Ercolano, Kniazev, 2014, MNRAS, 439, 3605)

SALT spectroscopy of IRC-10414 and its arc-like nebula

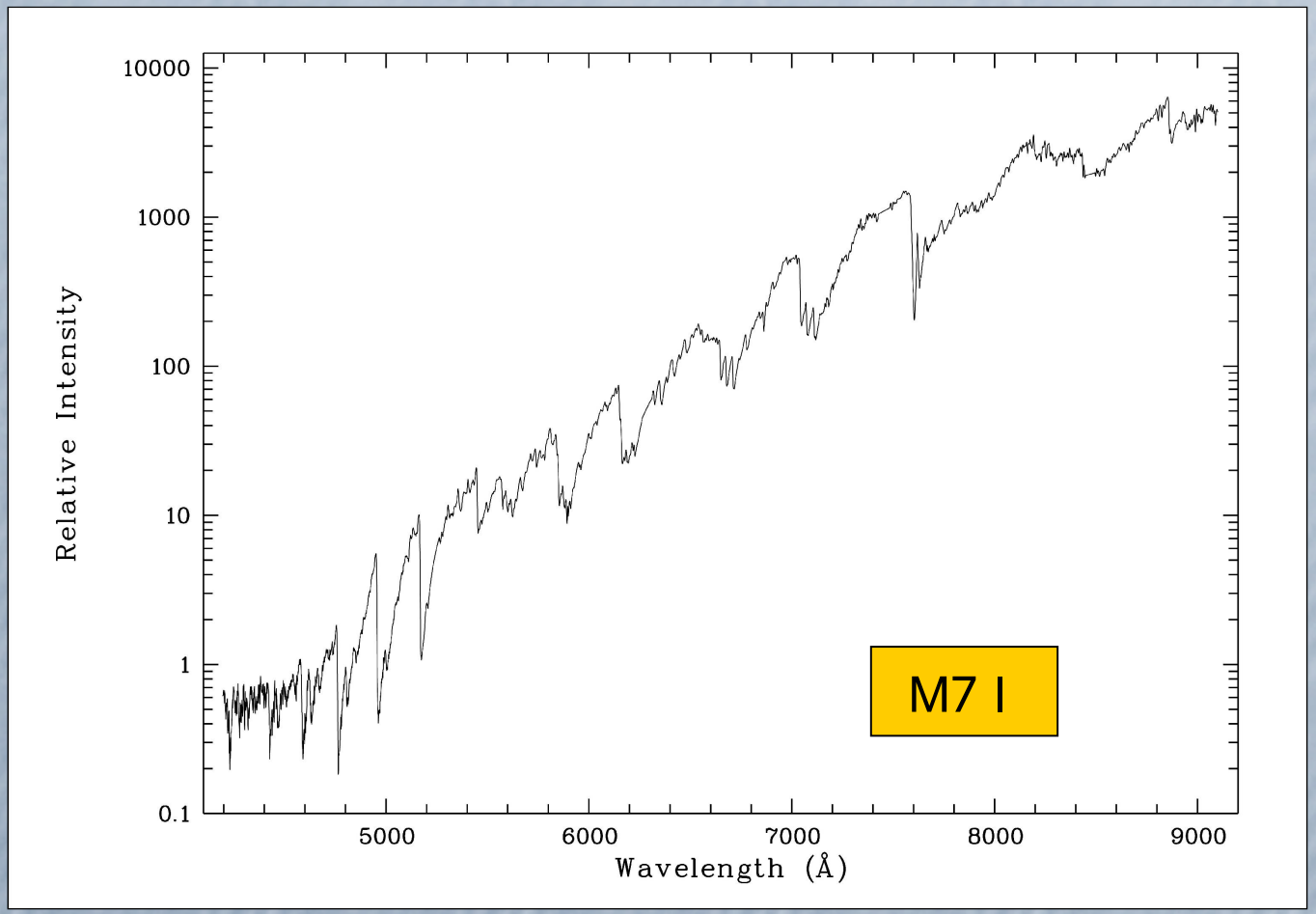


SuperCOSMOS Hα+[NII]

DSS-II red

(Gvaramadze, Menten, Kniazev, et al., 2014, MNRAS, 437, 843)

IRC-10414: a runaway M7 supergiant



(Gvaramadze, Menten, Kniazev, et al., 2014, MNRAS, 437, 843)

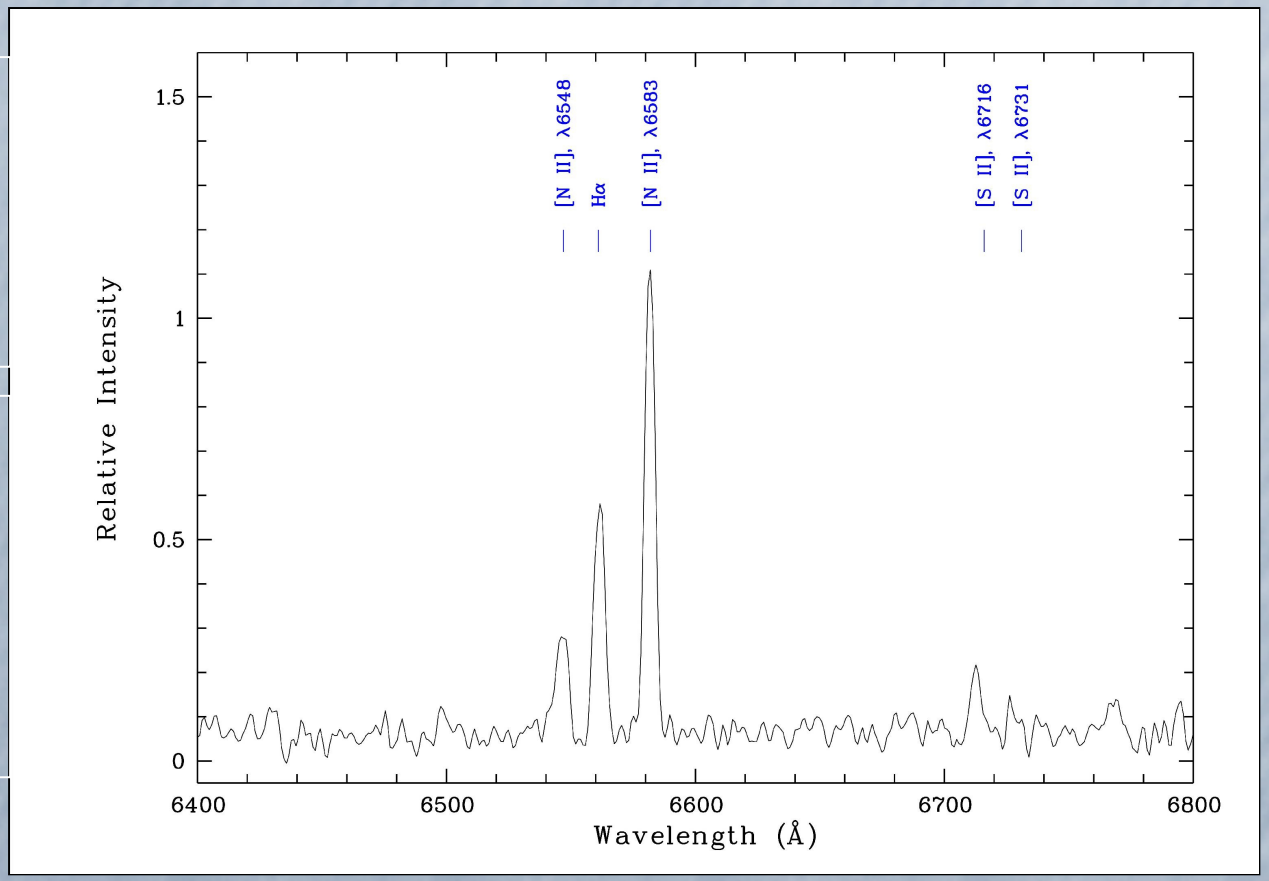
IRC-10414: Arc-like nebula is a bow shock

[SII]/Hα=0.4

=> shock-heated

A first-ever optically detected bow shock around a RSG!

(done with SALT)



(Gvaramadze, Menten, Kniazev, et al., 2014, MNRAS, 437, 843)

Determining the radial velocity for the Local Group suburb galaxy KK258 (1)

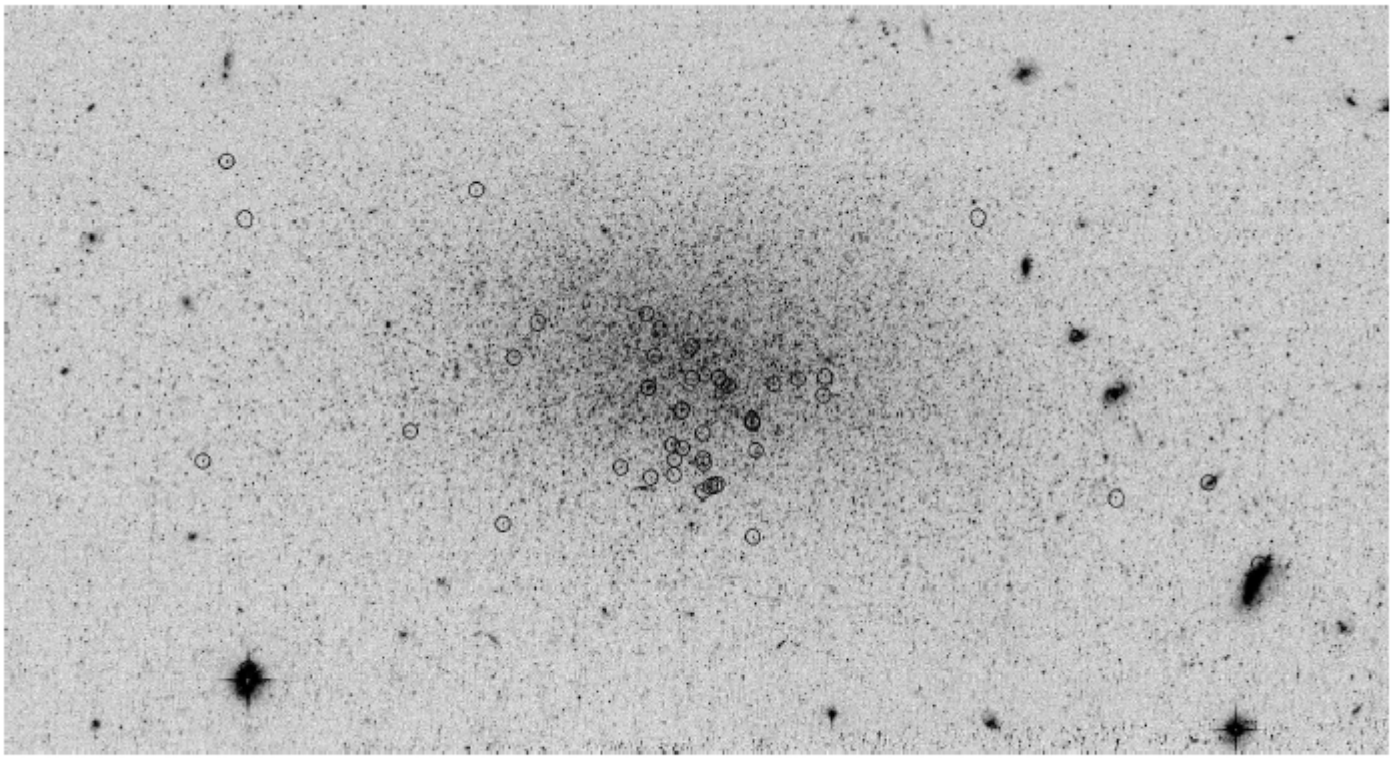
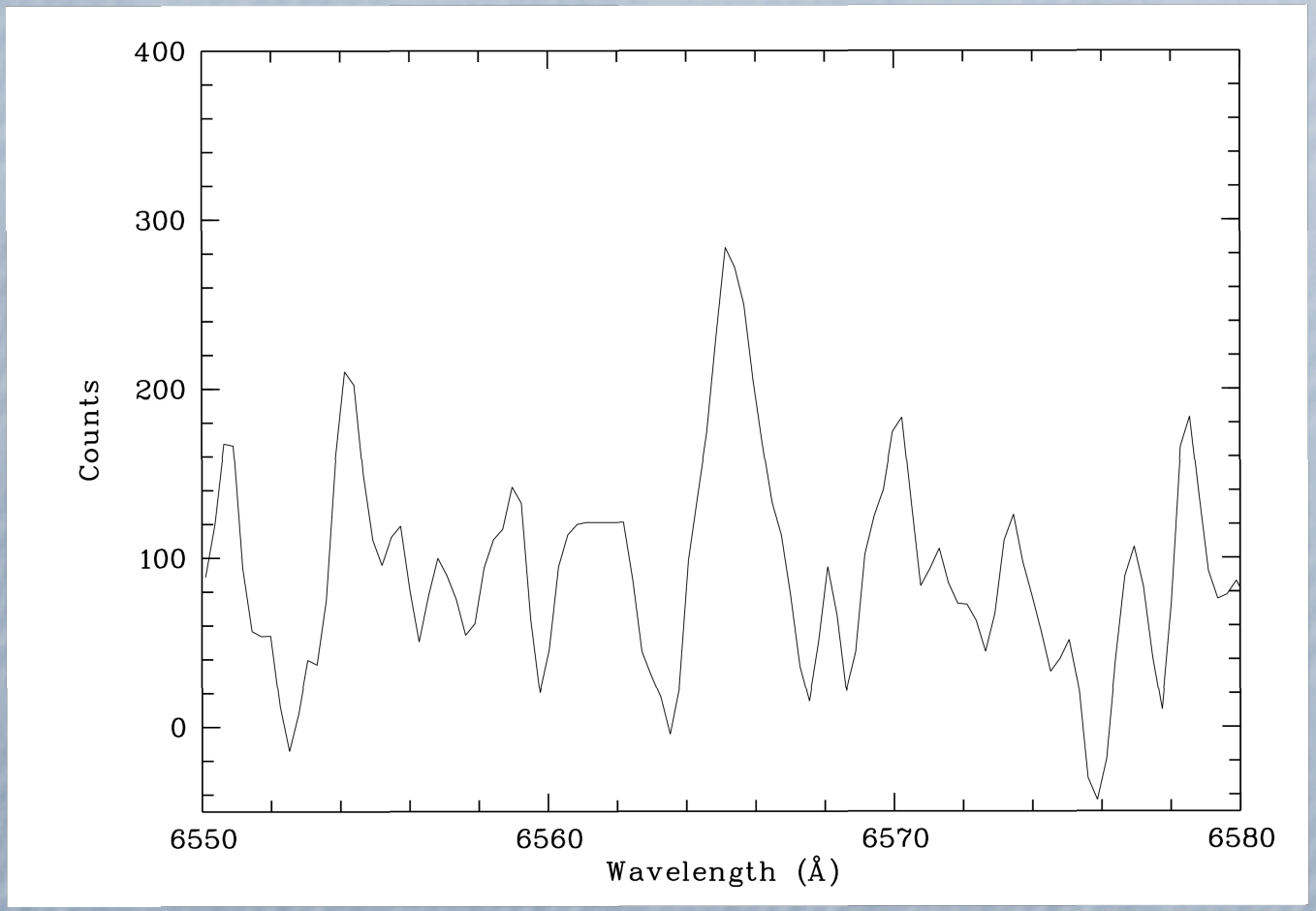


Figure 1. *HST*/ACS image of KK258 in *F606W* filter. The image size is 3.0 × 1.6 arcmin. Blue stars with $F606W-F814W \leqslant 0.2$ and $F814W \leqslant 25.5$ are shown with open circles.

Karachentsev, Makarova, Tully & Kniazev, 2014, MNRAS, submitted

Determining the radial velocity for the Local Group suburb galaxy KK258 (2)



Spectroscopic observations of the Hα knot in the KK258 were conducted with the SALT telescope on October 23, 2013 with RSS. To detect the narrow faint Hα line the grating GR2300 was used to cover the spectral range 6100−6900 Å with FWHM spectral resolution of 1.39±0.05 Å The total exposure time was 1950s, which was broken up into 3 subexposures.

Determining the radial velocity for the Local Group suburb galaxy KK258 (3)

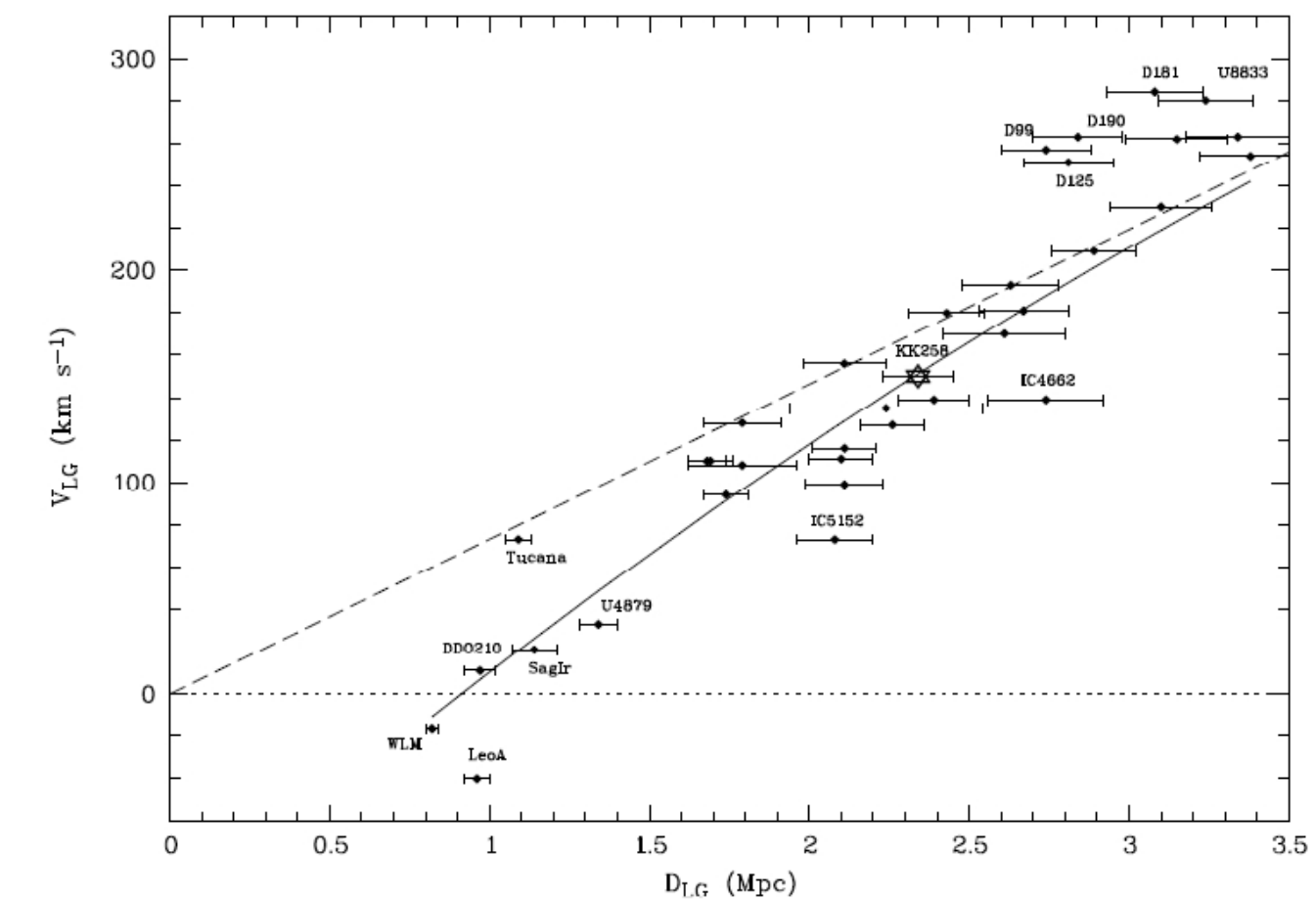


Figure 5. Relation between radial velocities and distances of the 35 nearest isolated galaxies.

We measure a distance of 2.23±0.05 Mpc using the Tip of Red Giant Branch method. We also detect Hα emission from this gas-poor dwarf transition galaxy at the velocity V_hel = 92±5 km/s or VLG = 150 km/s. With this distance and velocity, KK258 lies near the local Hubble flow locus with a peculiar velocity 3 km/s.