

M83
HST WFC3/UVIS
11360 12413

F336W *U*
F438W *B*
F547M γ (F555W *B*)
F657N H α
F814W *I*

Investigating Massive Stars in M83

12th Hel.A.S. Conference

1 July 2015

Stephen Williams



Collaborators



Alceste Bonanos, NOA

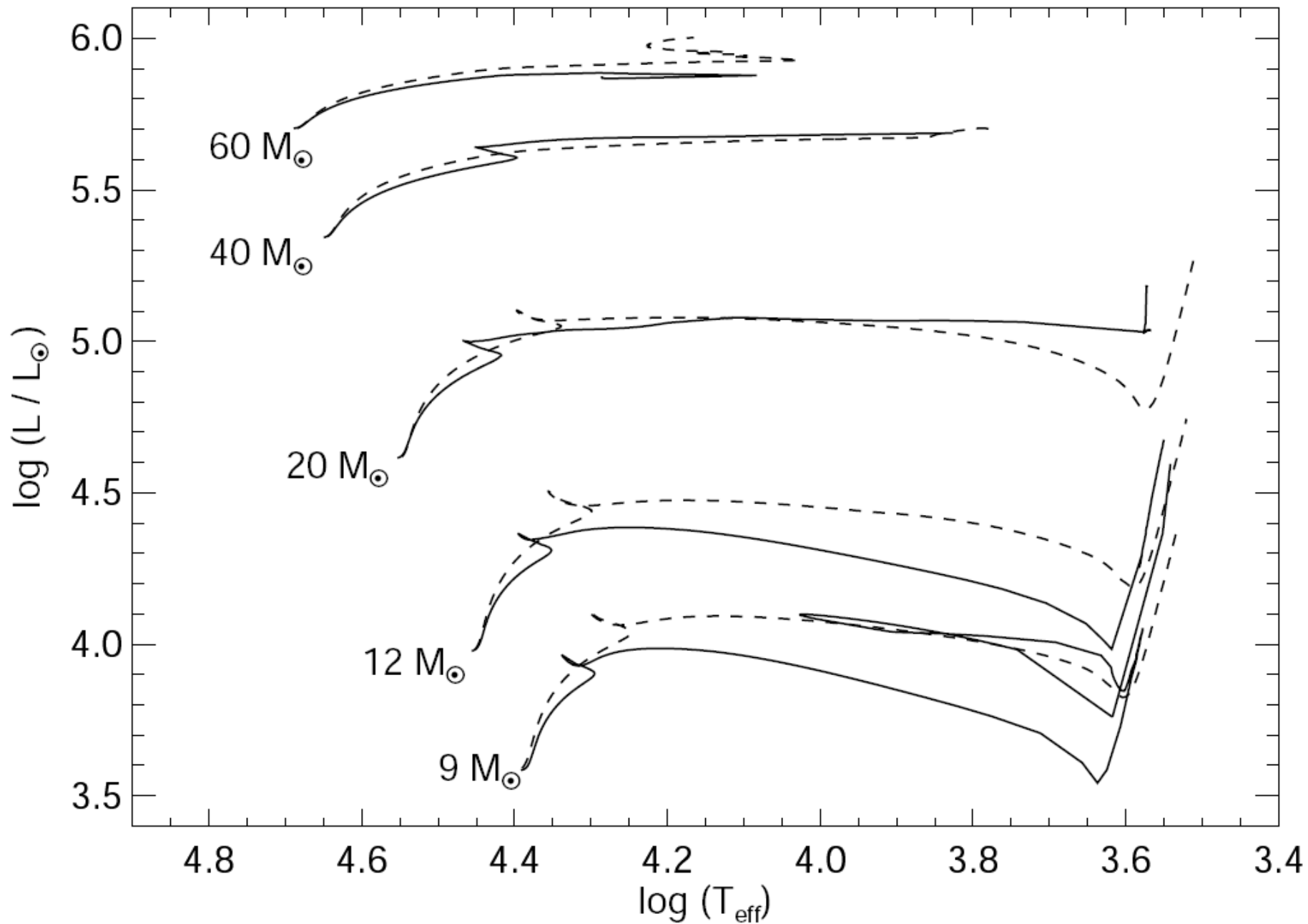
Michalis Kourniotis, NOA

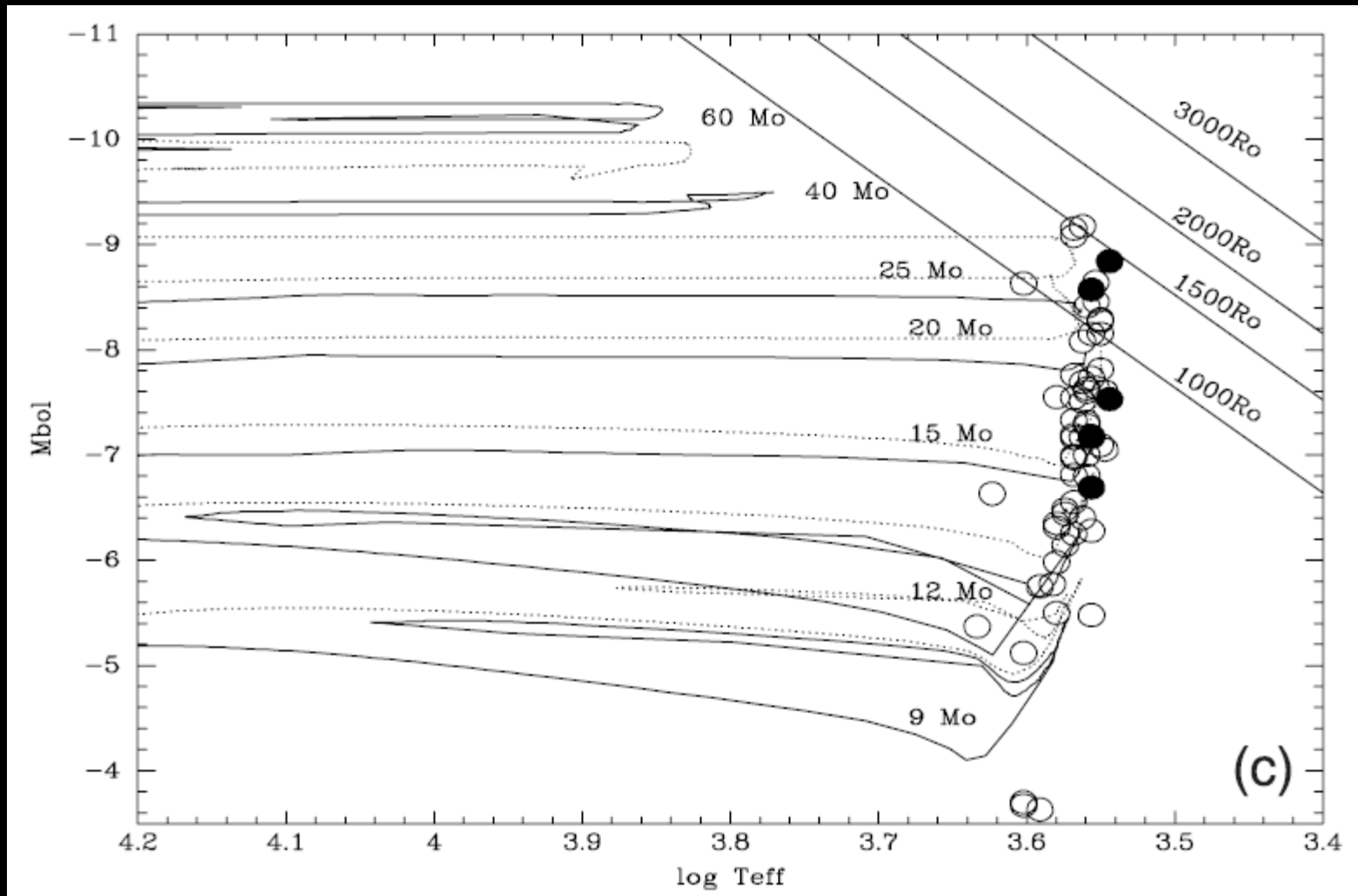
Nikolay Britavskiy, NOA

Jose Prieto, Universidad Diego Portales, Chile

Brad Whitmore, STScI, USA

William Blair, JHU, USA





Levesque et al. 2005

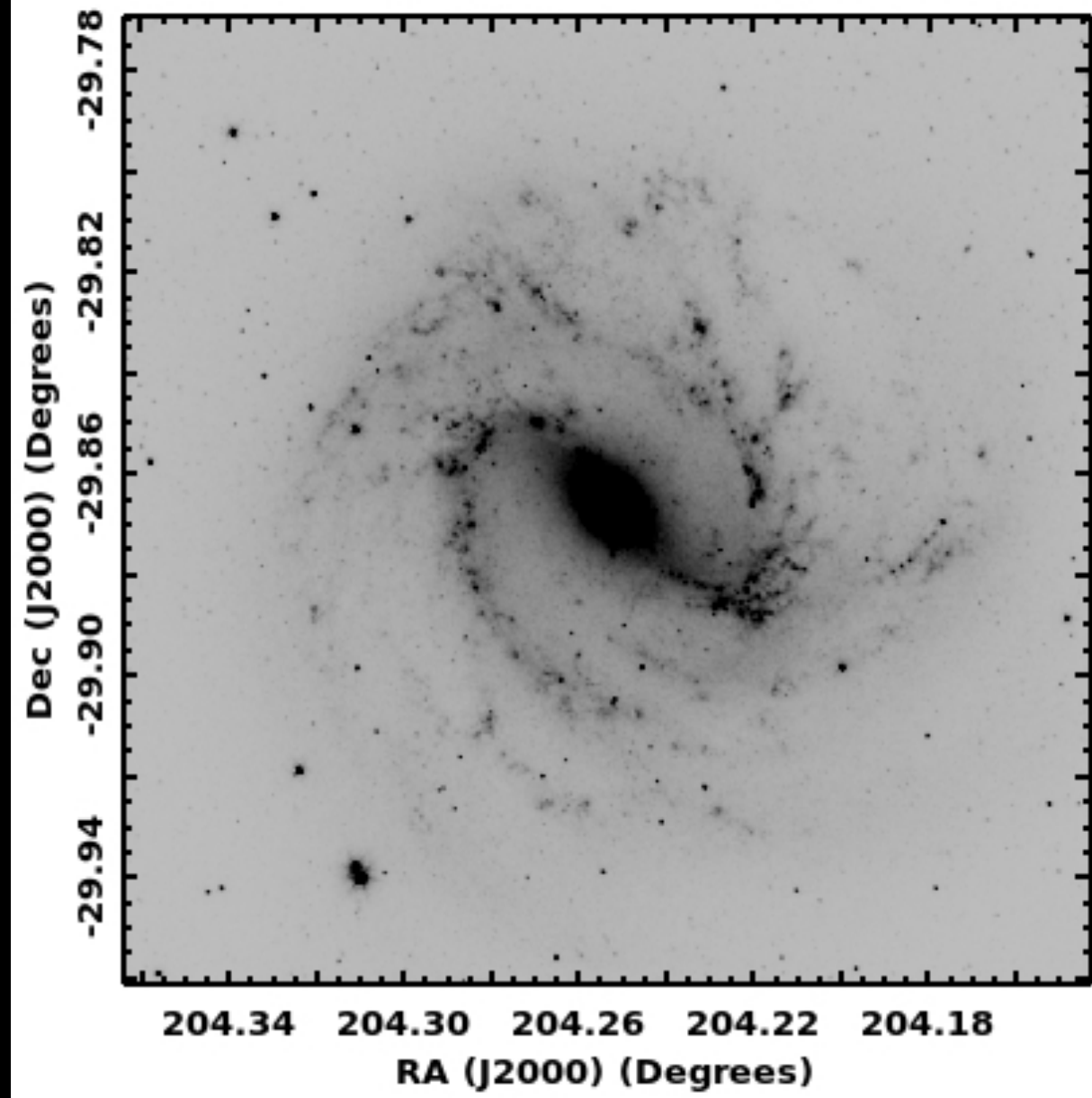
Red Supergiants

- Hayashi Limit
 - Opacity (metallicity)
 - Mixing length parameter, α
- All modern codes use the same α
- All codes predict different T_{eff} for Hayashi limit

of RSGs. The reasons for this are unclear. The solution to this problem will ultimately come from reliable temperature measurements of RSGs. The results presented here are therefore a significant step toward understanding the nature of convection in cool stars.

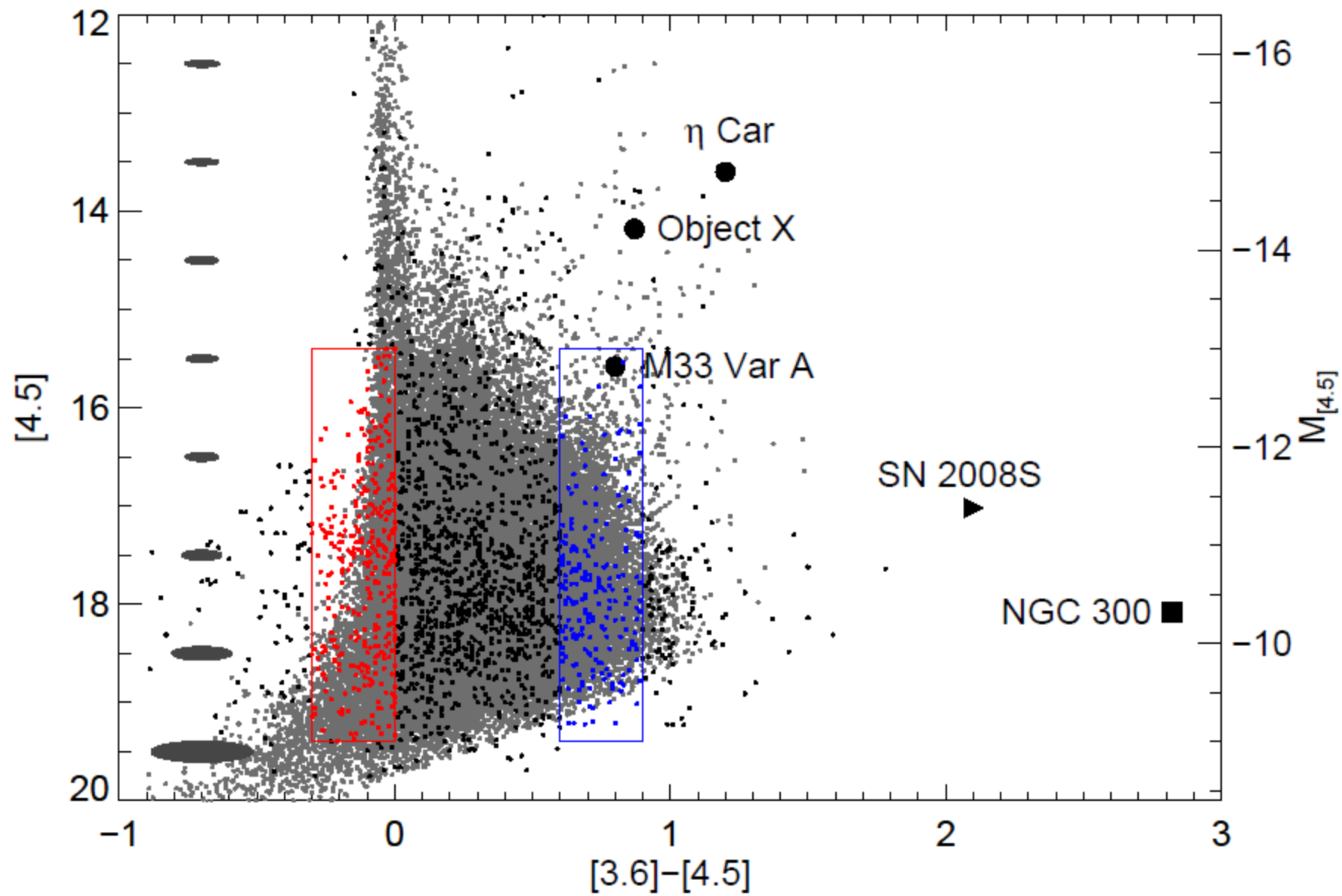
M83:

- D=4.6 Mpc
- High H α Lum.
- Six type II SNe



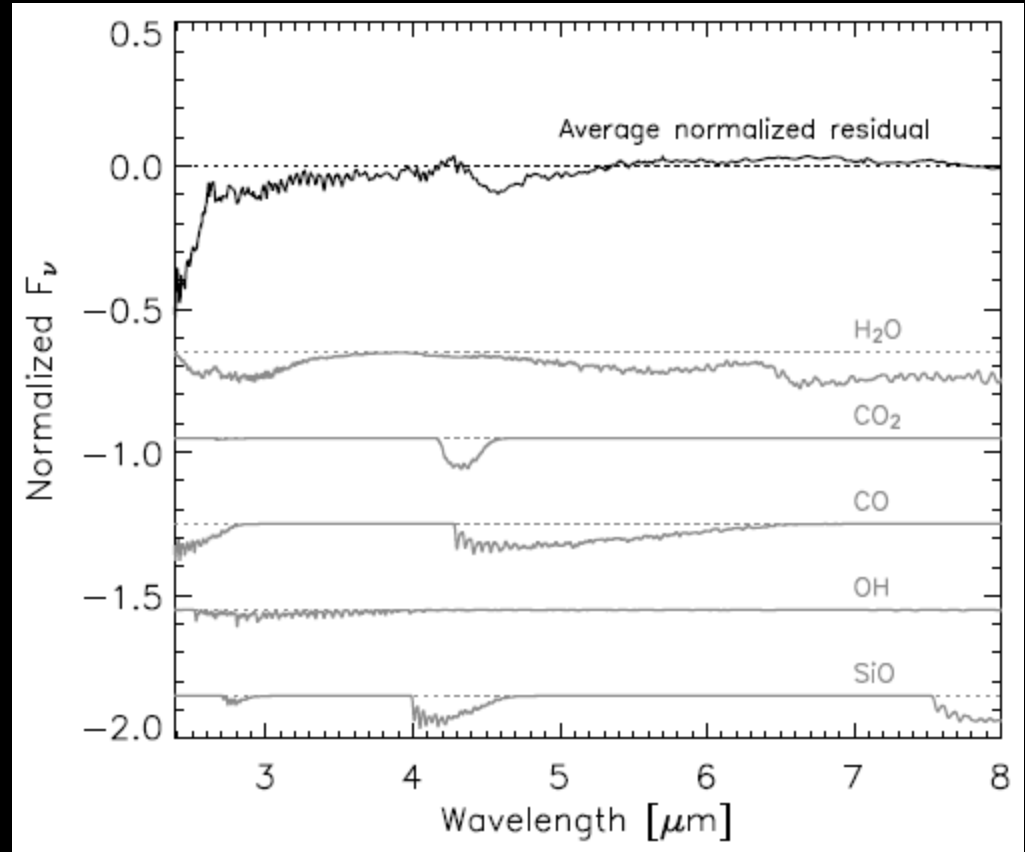


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Blue RSGs?

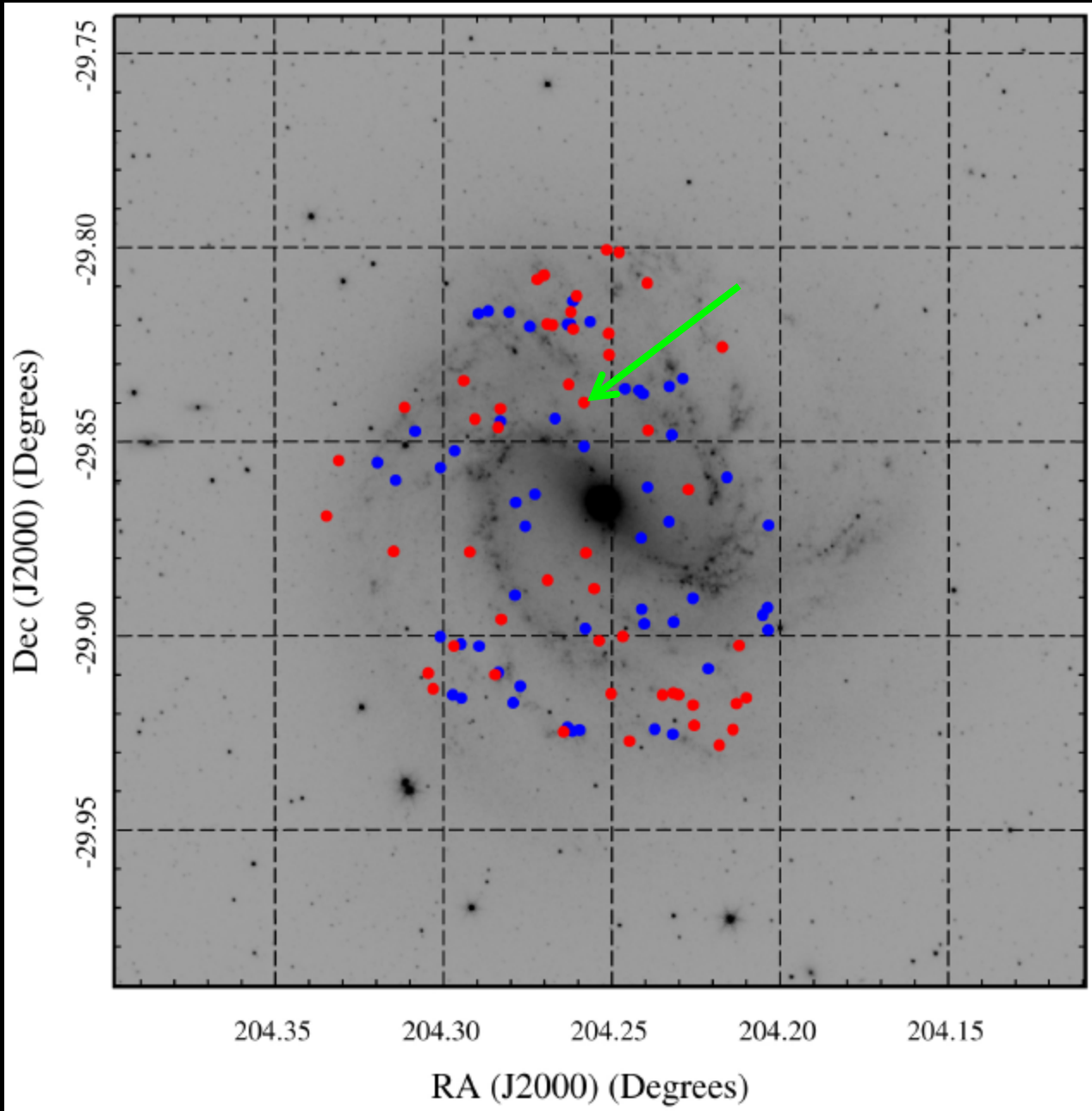
- Verhoelst et al. 2009
- Flux in 4.5 μm band is suppressed
- Thus, RSGs appear “blue”

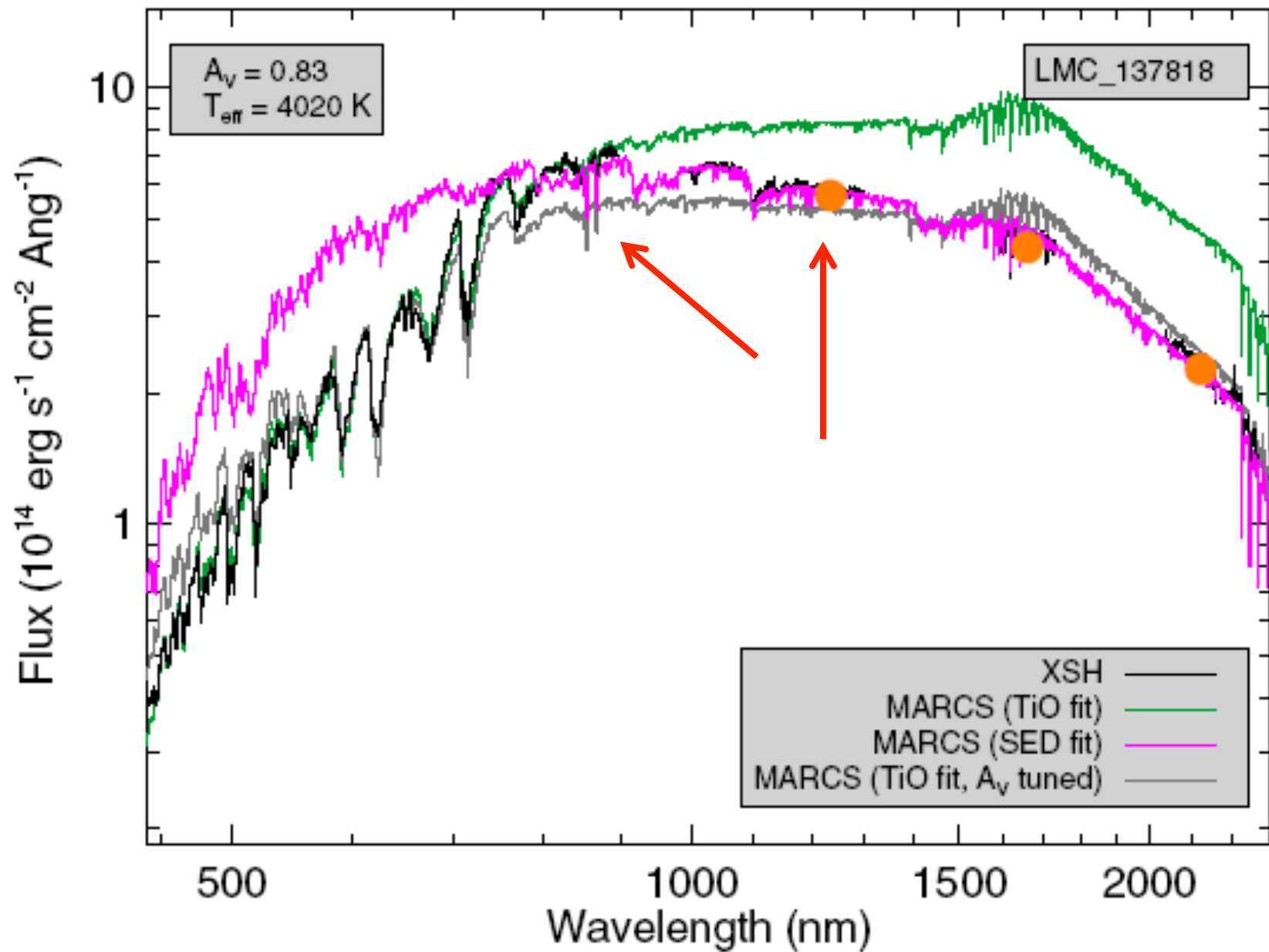


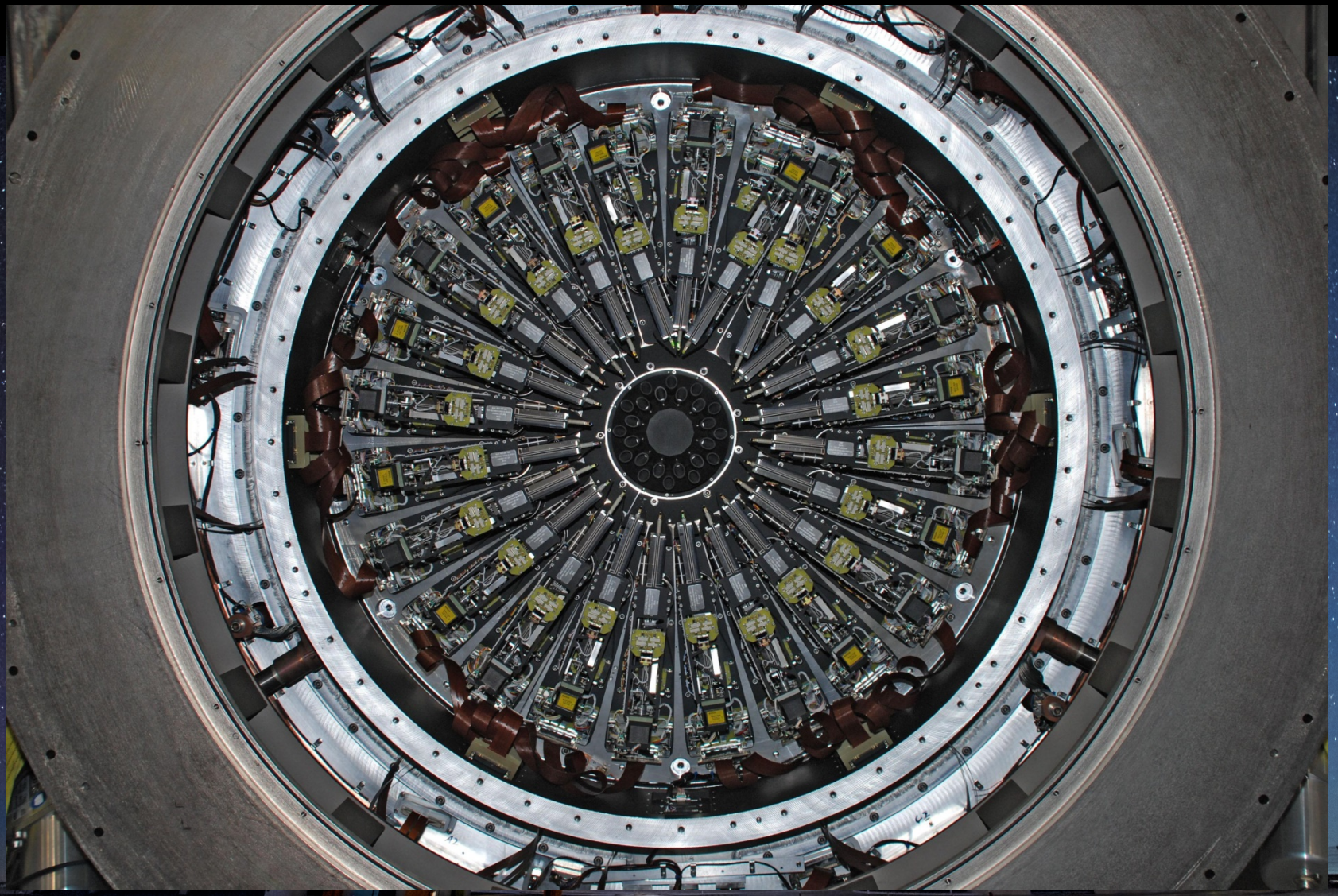
Spitzer PSF:
1.7" \rightarrow 40 pc

HST PSF:
0.1" \rightarrow 2 pc

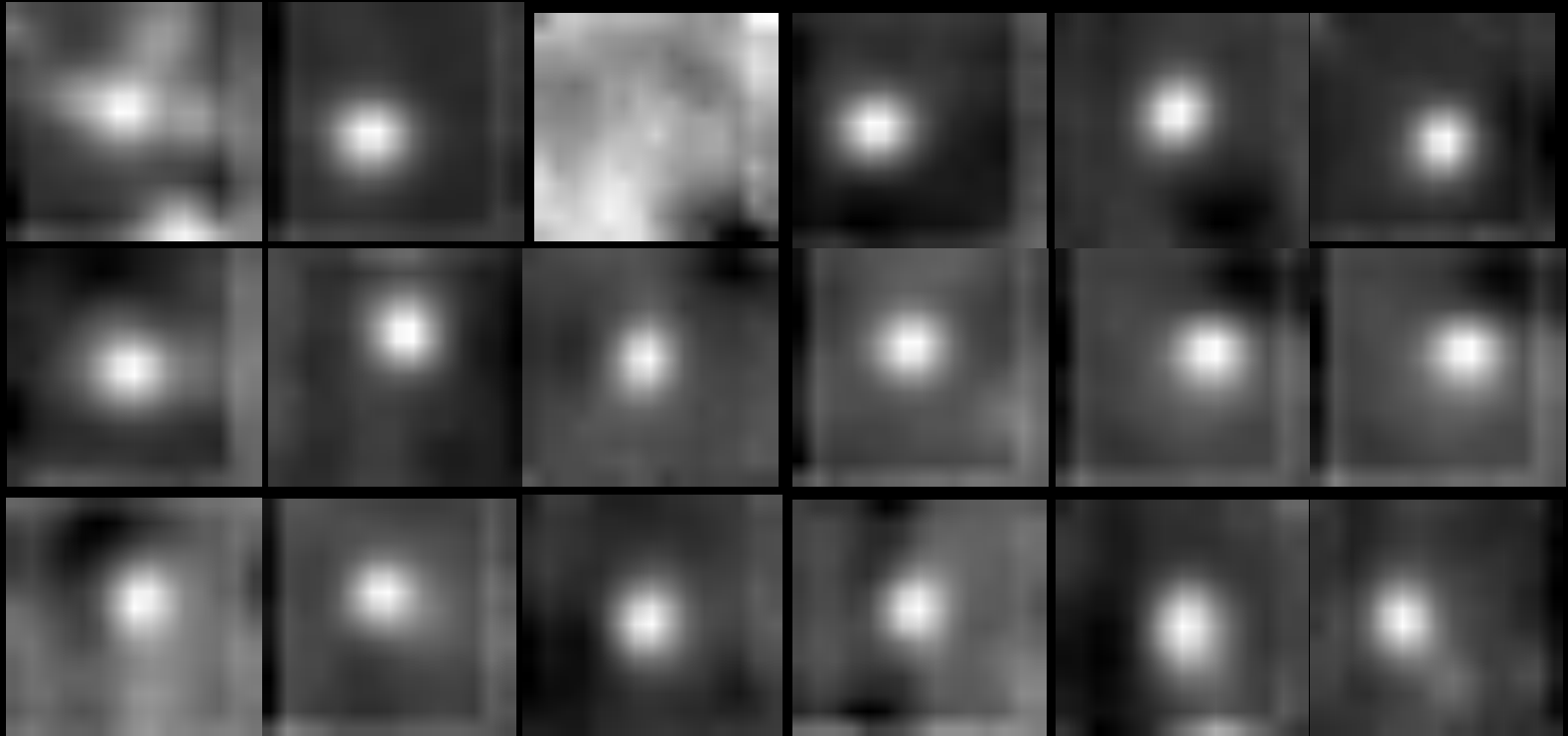




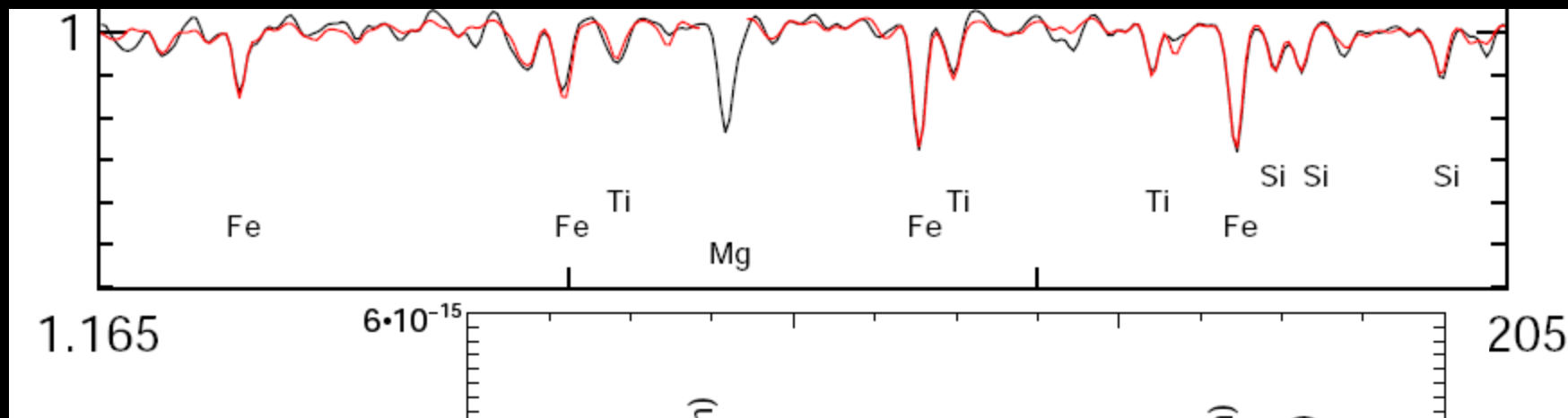




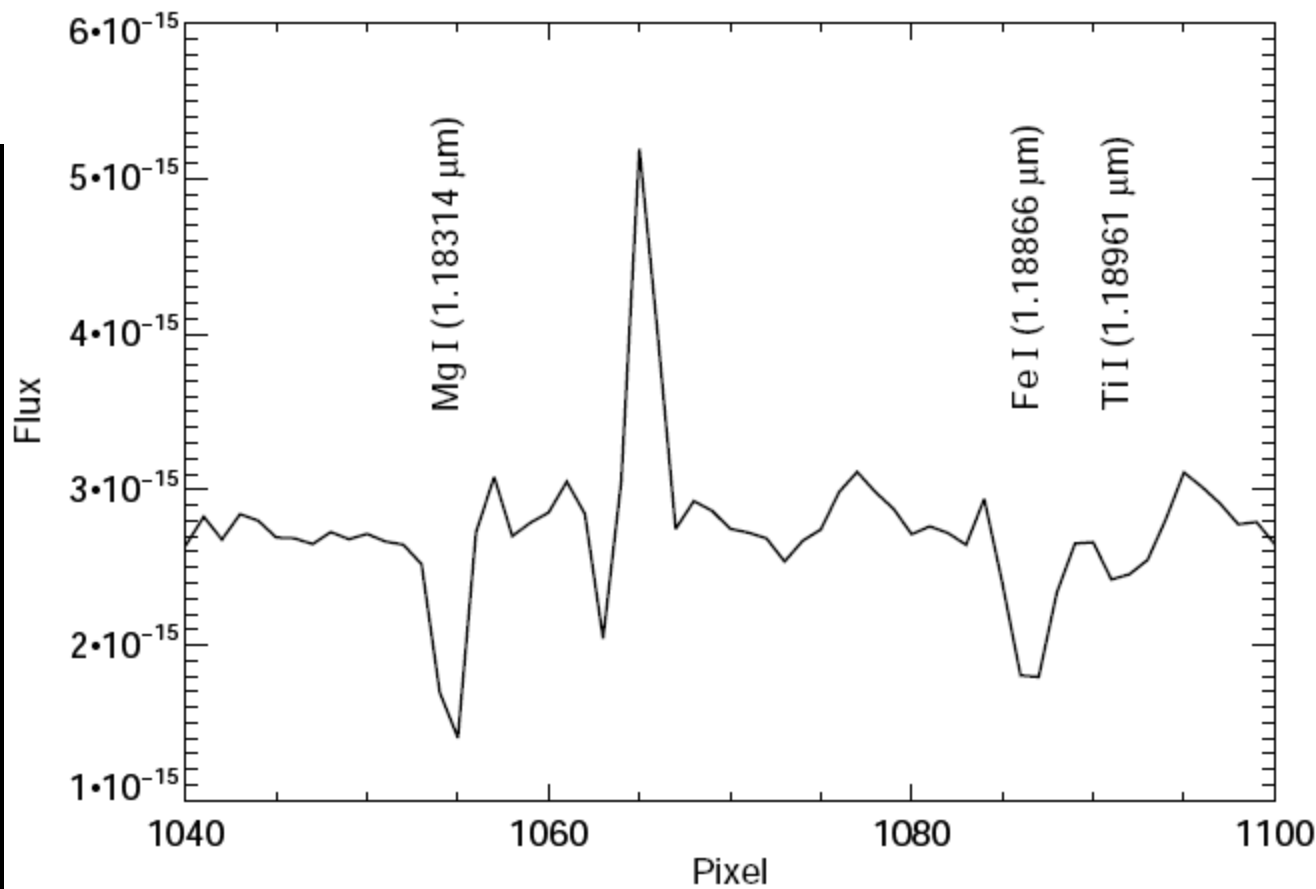
M83 Targeted Objects



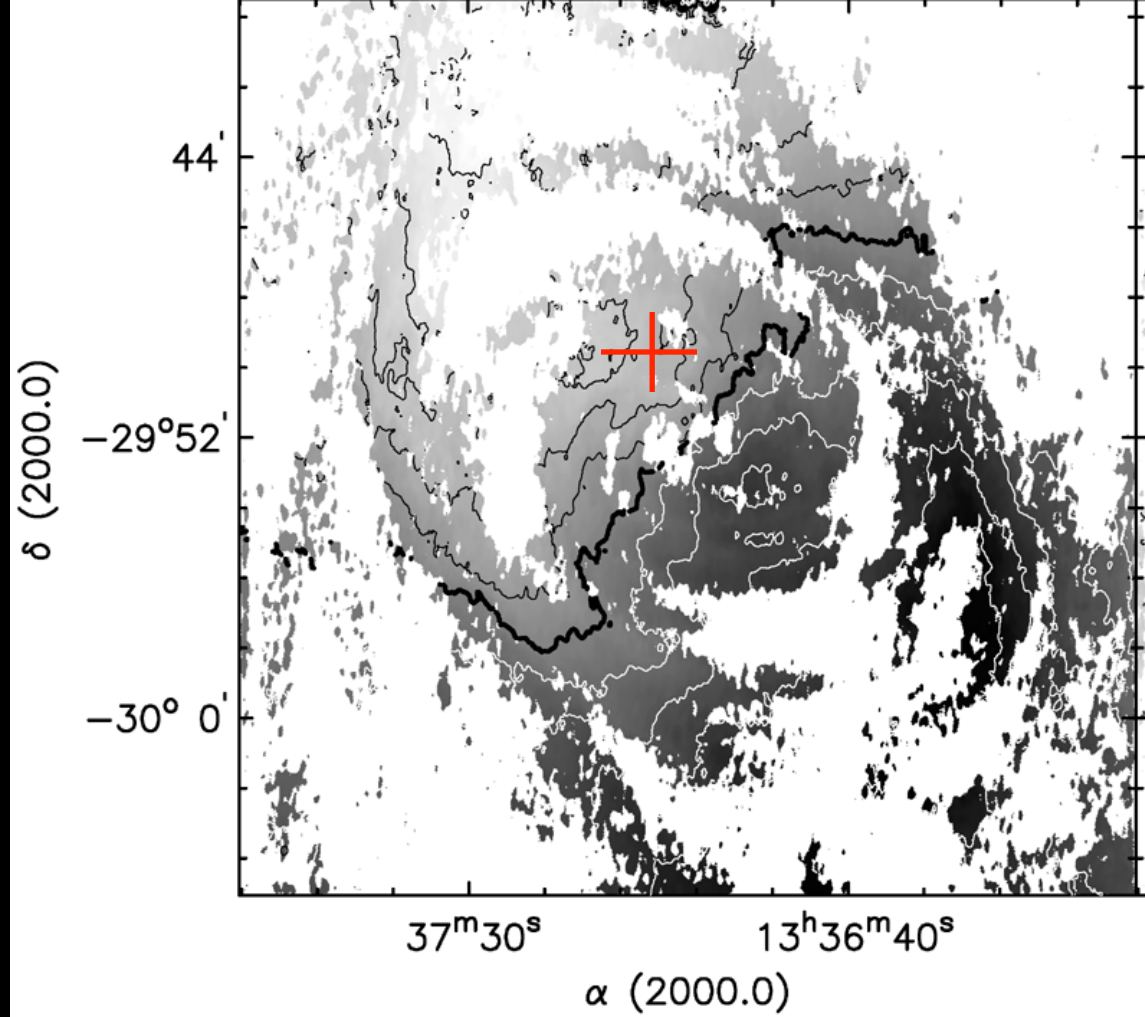
Gazak et al. 2014



V_r :
 444 ± 10 km/s



THINGS Survey
M83 rotation
curve
Walter et al. 2008



Most distant spectroscopically confirmed RSG?

Summary

- Massive evolved stars in nearby galaxies
- Test/constrain stellar evolutionary theory
 - Studies of SN progenitors & other transients
- *Spitzer* and *HST* (IR and optical)
- Follow up spectroscopy
- Census of RSGs across metallicities