

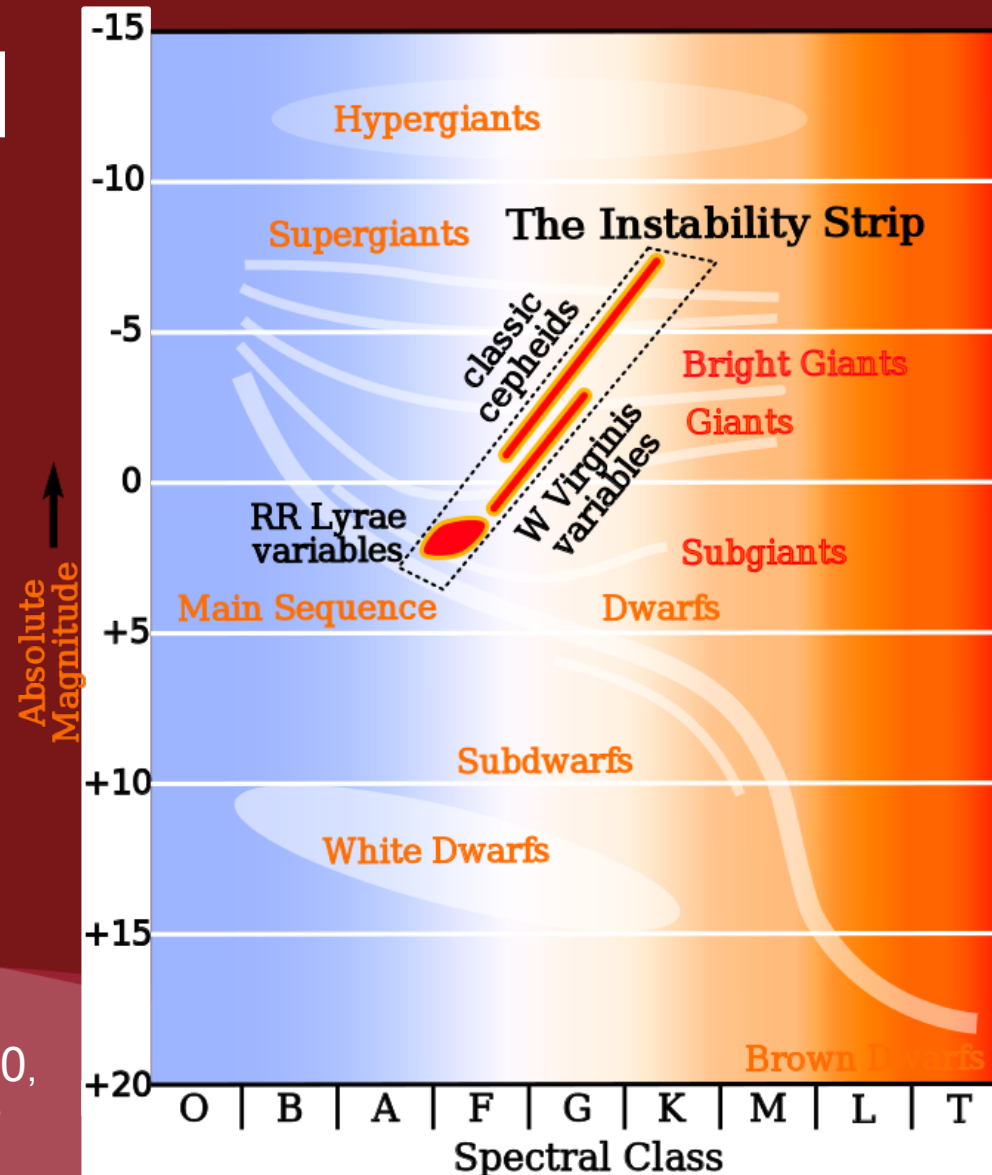
A Study of the Variability of Yellow Supergiant Stars

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U N I V E R S I T Y

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Physics, Astronomy, and Materials Science

Background

- Yellow Supergiants
 - Population I
 - F and G Spectral Class
- Instability Strip
 - Variable Stars



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Observations & Reductions

- 10 days from Oct. – Dec. 2015
- 7 Program Stars
 - SIMBAD¹: Spectral Class F0→K0, Luminosity Class ≤ II
- HD 200803 was the control pair
- IRAF²
 - Bias, Dark, Flat
 - Differential Aperture Photometry



Analysis

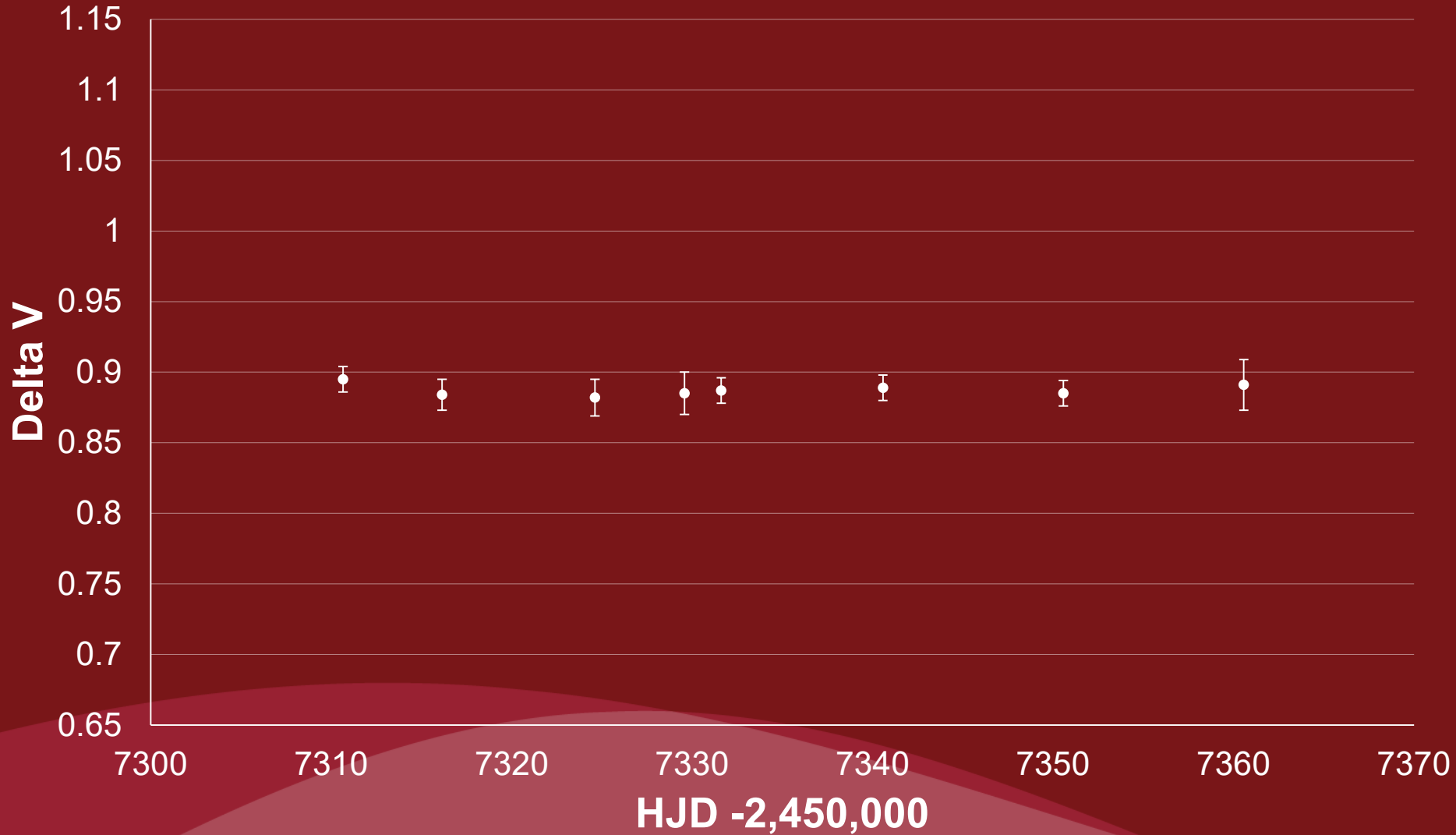
- Welch Stetson Index³
- Avg. ΔV with respect to comparison star
- *pdm* used to find periods

HD	WSI	Avg. ΔV	σ (Avg. ΔV)
240073	1371	1.18	0.110
216105	632	1.48	0.150
200803	13.7	0.38	0.015
193205	8.1	2.07	0.009
200805	1.8	1.99	0.004
191010	1.7	2.00	0.006
212312	1.4	0.89	0.004
235518	0.9	1.93	0.005

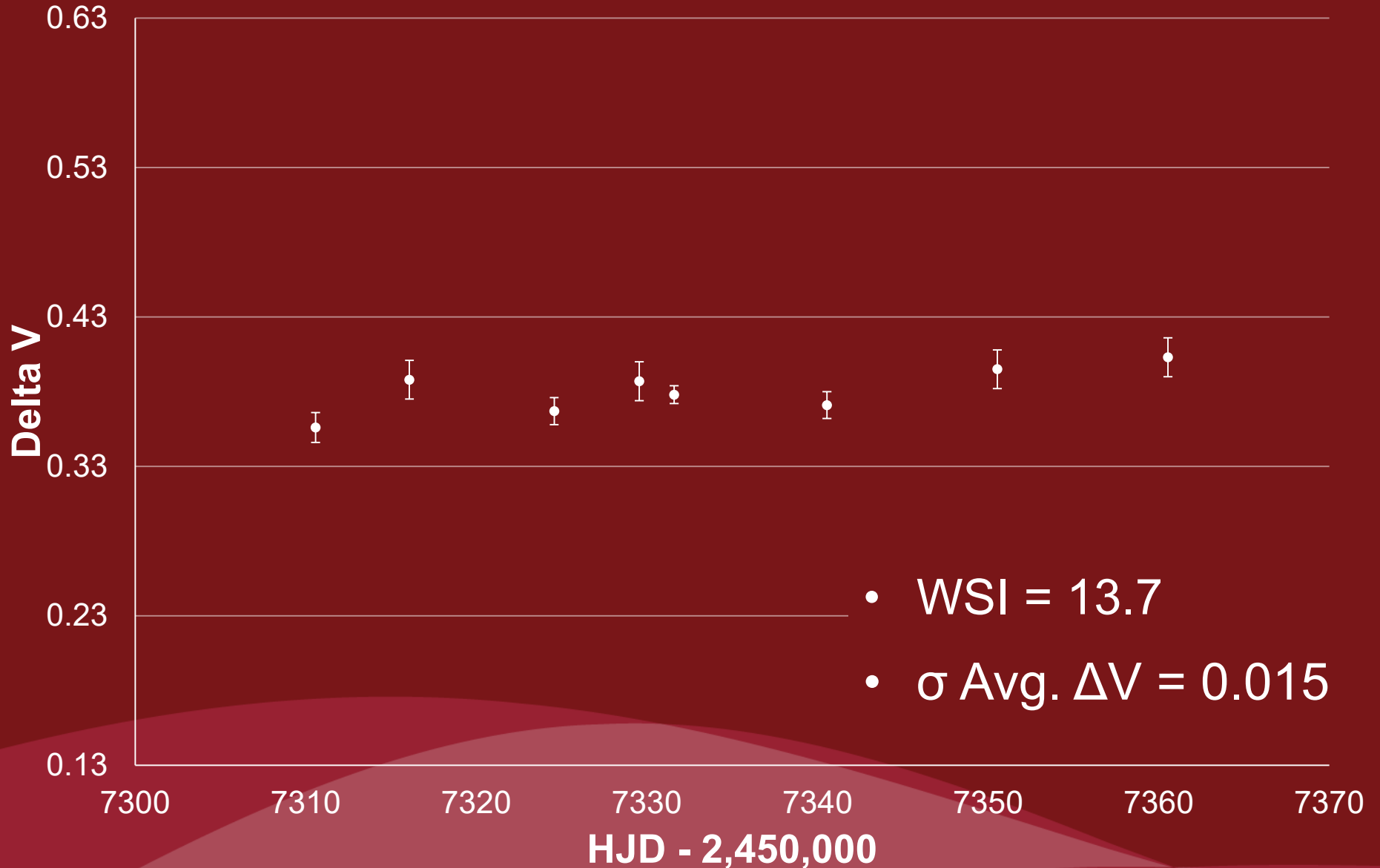
Light Curves

- HD 212312: Non-Variable YSG
- HD 200803: Control Pair
- HD 193205: Suspected Variable
- HD 240073: Known Cepheid
- HD 216105: Known Cepheid

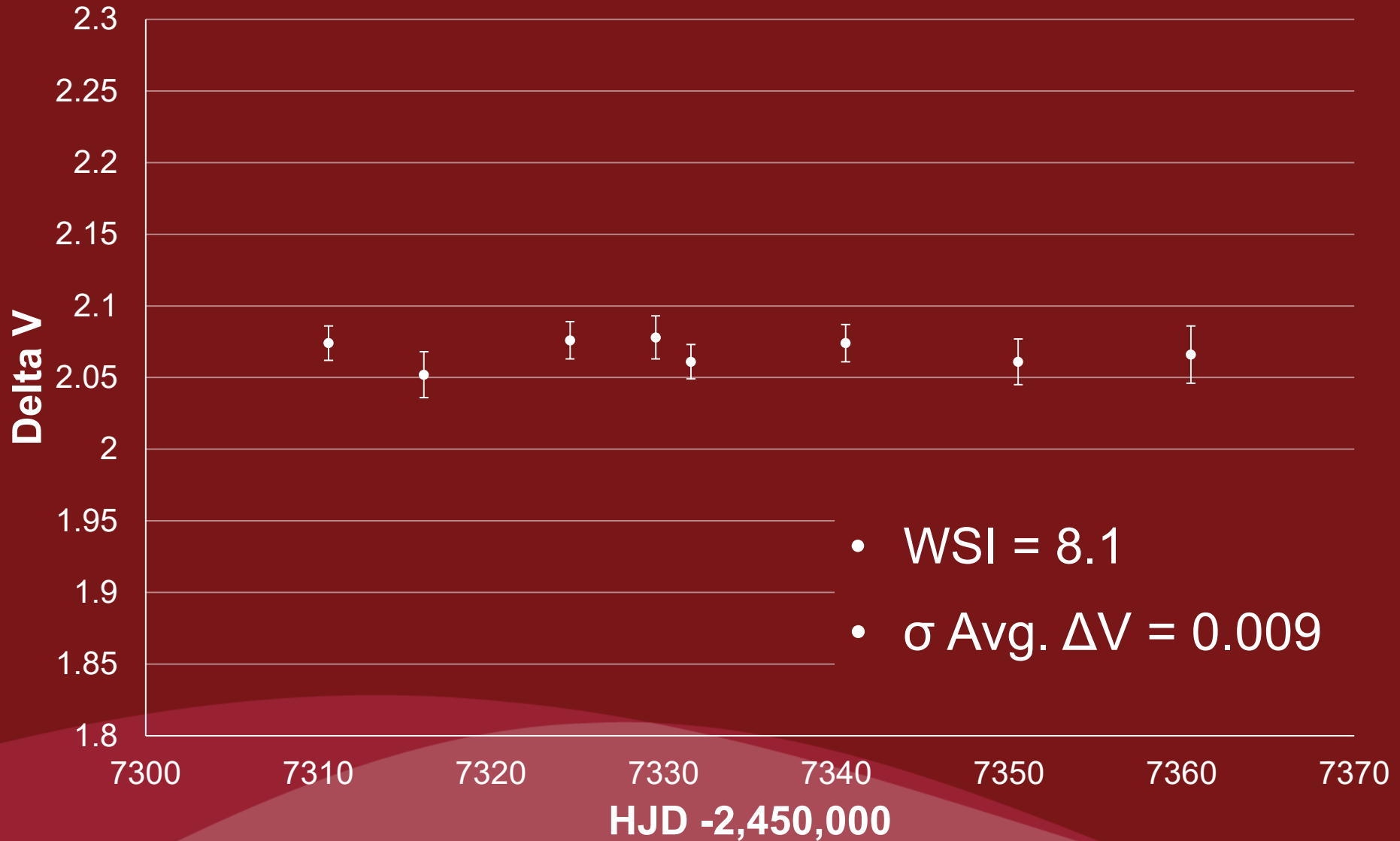
HD 212312 (Non-Variable)



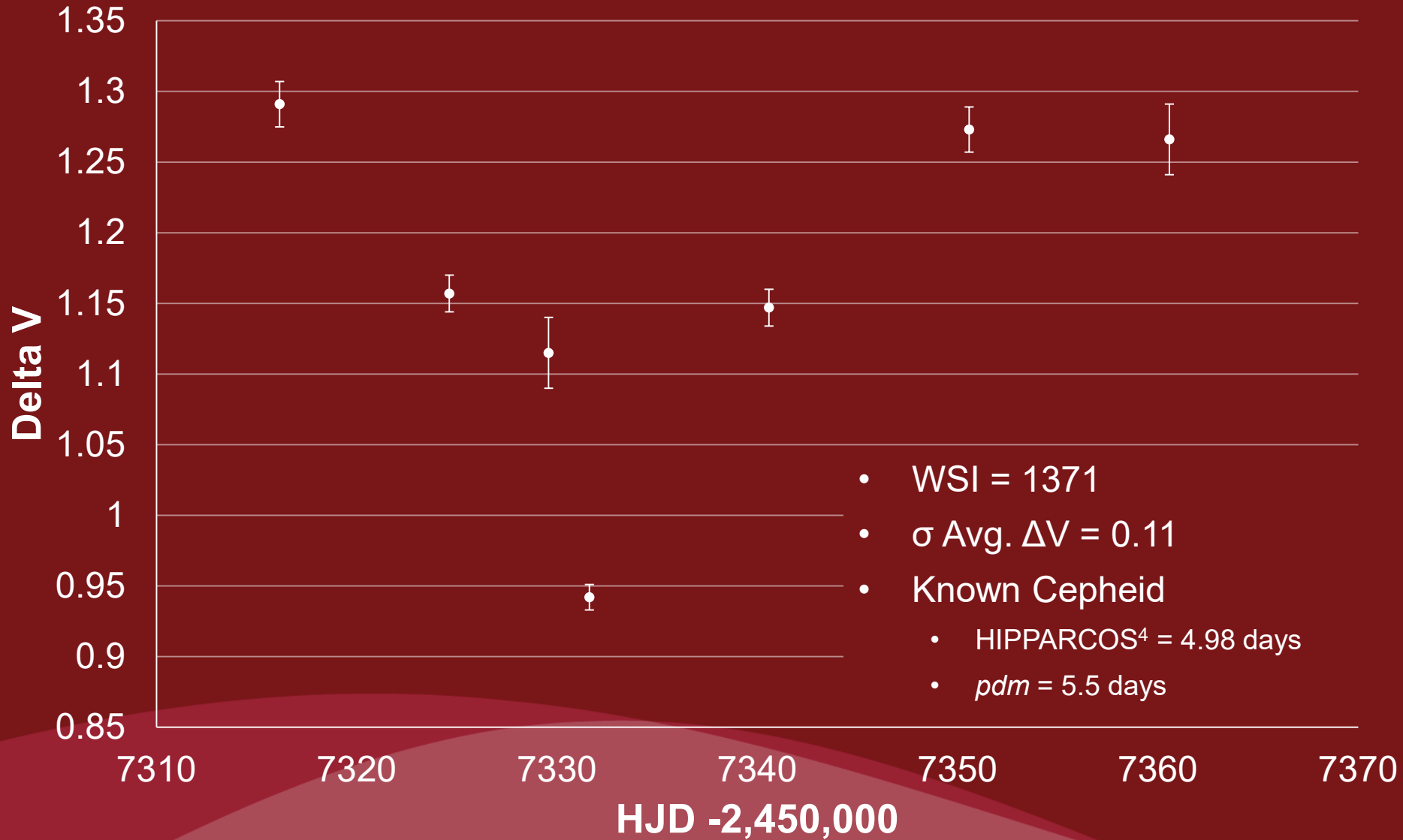
HD 200803 (Control)



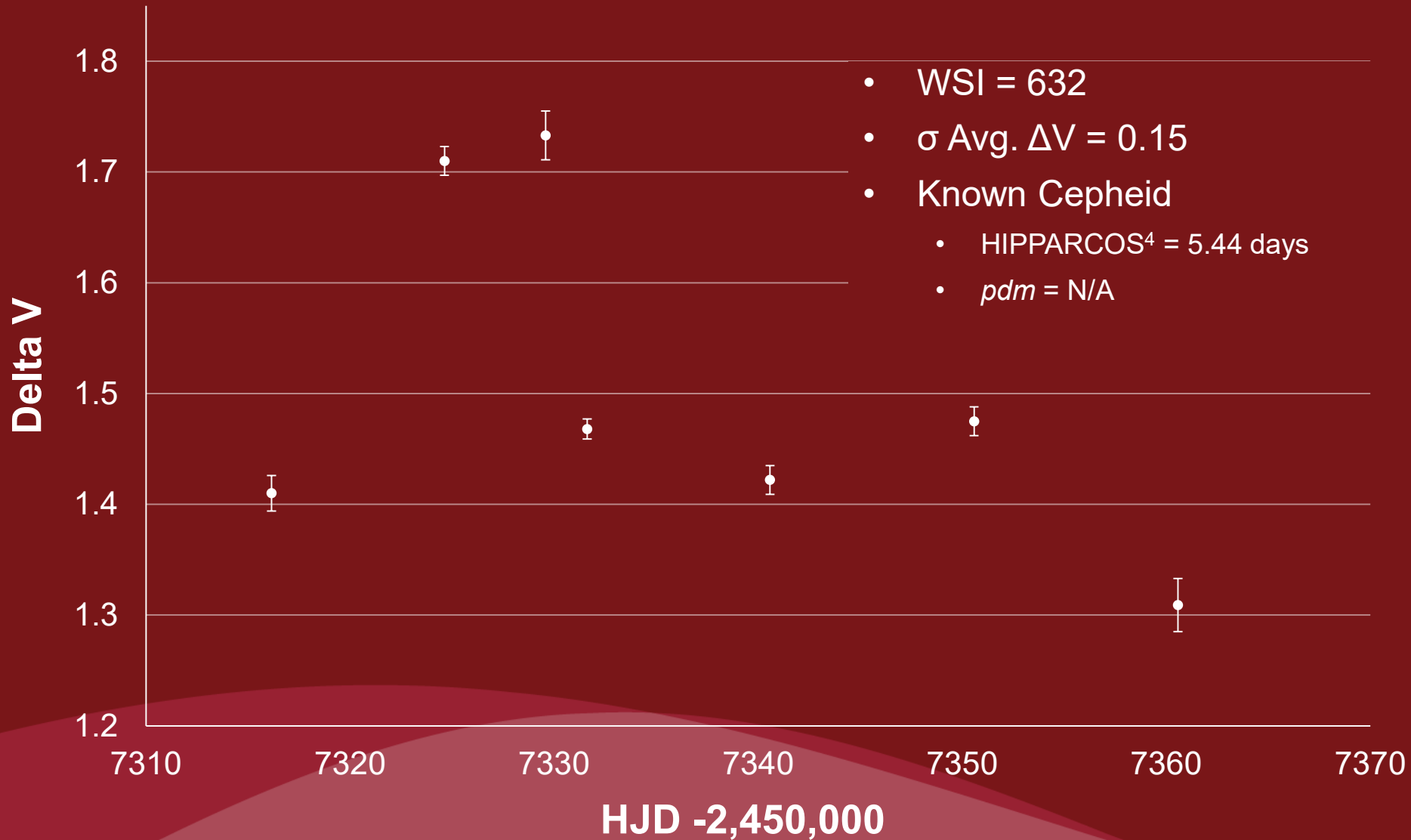
HD 193205 (Suspected Variable)



HD 240073 (=V Lac)



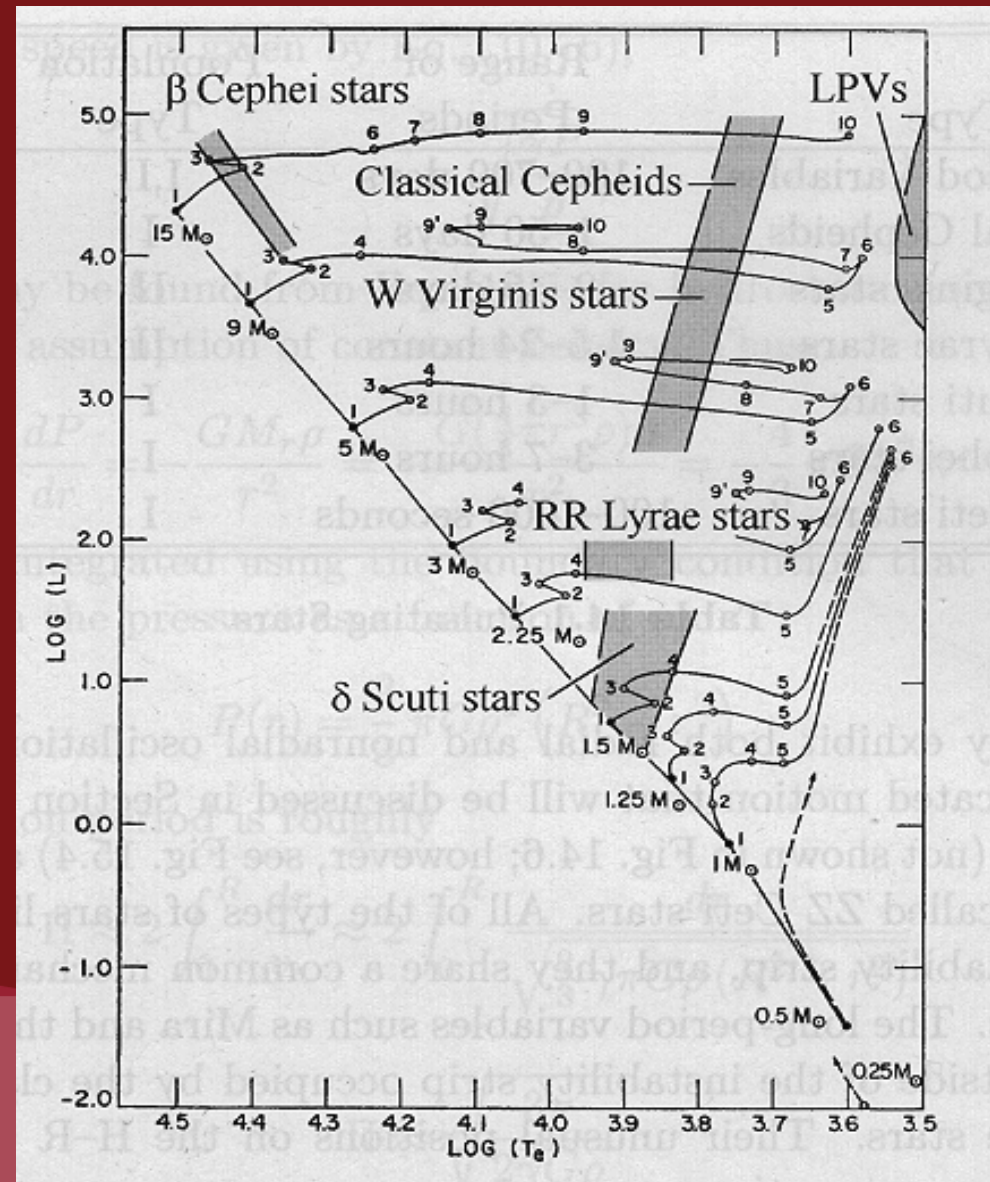
HD 216105 (=X Lac)



Conclusions

- Four of the Seven stars were found non-variable at 1% precision level
- Two Classical Cepheids, HD 240073 (=V Lac) and HD 216105 (=X Lac), were recovered
- HD 193205 – possible low-level variability with an amplitude of .01 magnitude
- HD 200803 (Control) – Exhibits some variability, not seen in past

- YSG are evolved stars
- Evolutionary tracks oscillate horizontally
- Non-variable YSG must lie outside the instability strip



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<http://burro.case.edu/Academics/Astr222/Galaxy/Distances/variables.html>

References / Acknowledgements

1. Wenger, M., et al. 2000, The SIMBAD astronomical database (Strasbourg, France: CDS)
2. IRAF is distributed by the National Optical Astronomy Observatories, which is operated by the Association of Universities for Research in Astronomy, Inc. under contract to the National Science Foundation
3. Welch, Stetson, 1993, The Welch-Stetson Variability Index
4. Perryman, M., et al. 1997, The HIPPARCOS Catalogue (European Space Agency)

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