First Photometric and H-alpha study of a Marginal Contact Binary TYC 5532-1333-1

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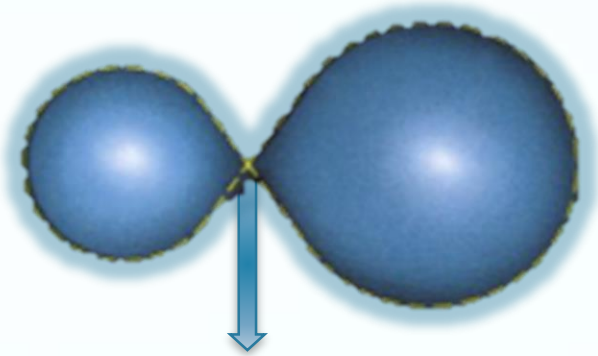
CONTACT BINARIES



Mass can flow from either star to the other across the inner Lagrangian point

These are systems in which the separation between the components is small and both components fill (or overfill) their Roche lobes.

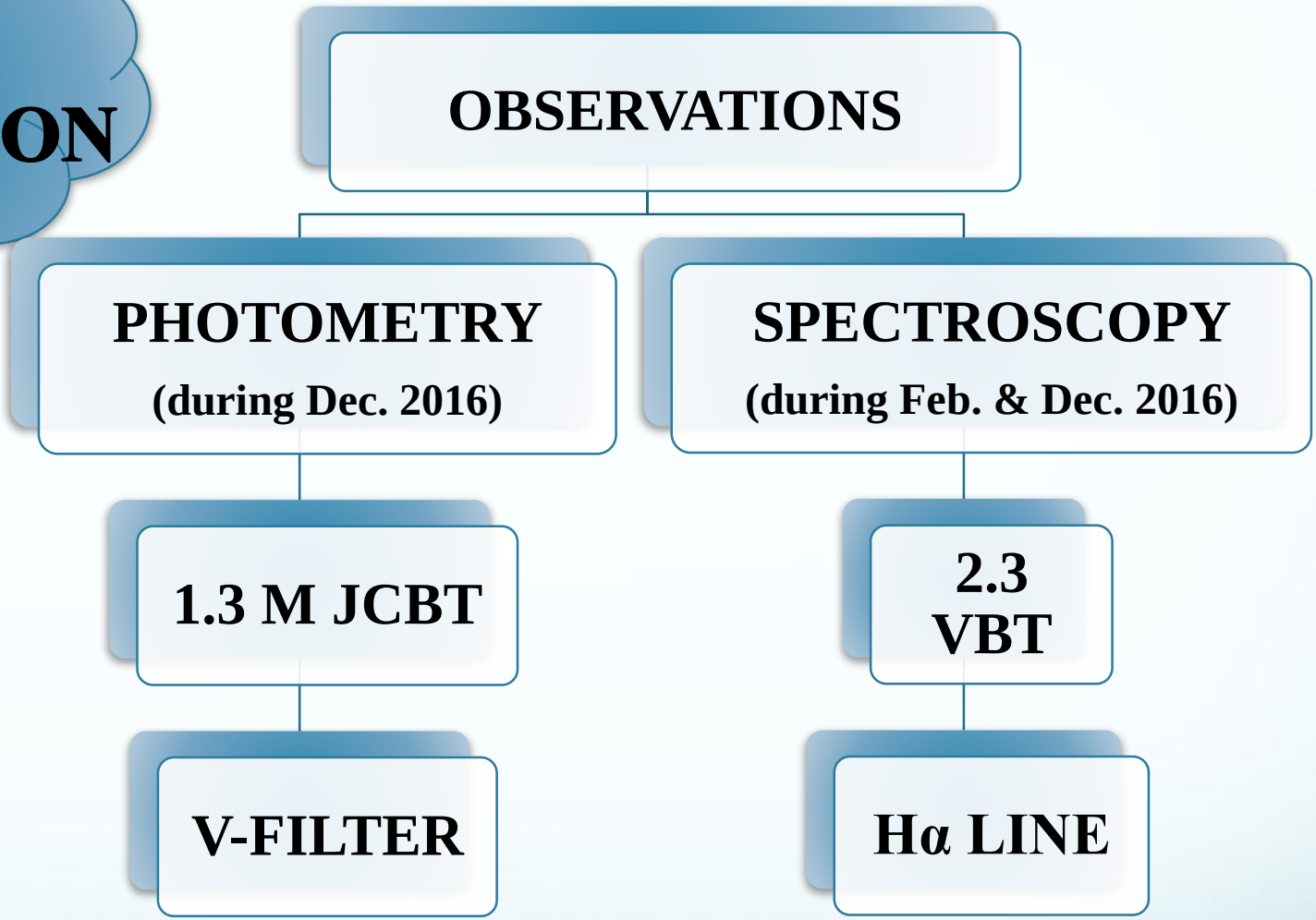
A- type

W-type

Variable ID	TYC5532-1333-1
Right Ascension	$12^h\ 21^m\ 18.73^s$
Declination	$-13^h\ 59^m\ 53.09^s$
Period	0.475 days
V_{mag}	11.010
B-V	0.481
V_{Amp}	0.489

Min I= 2457432.371711+0^d.474492E

DATA COLLECTION

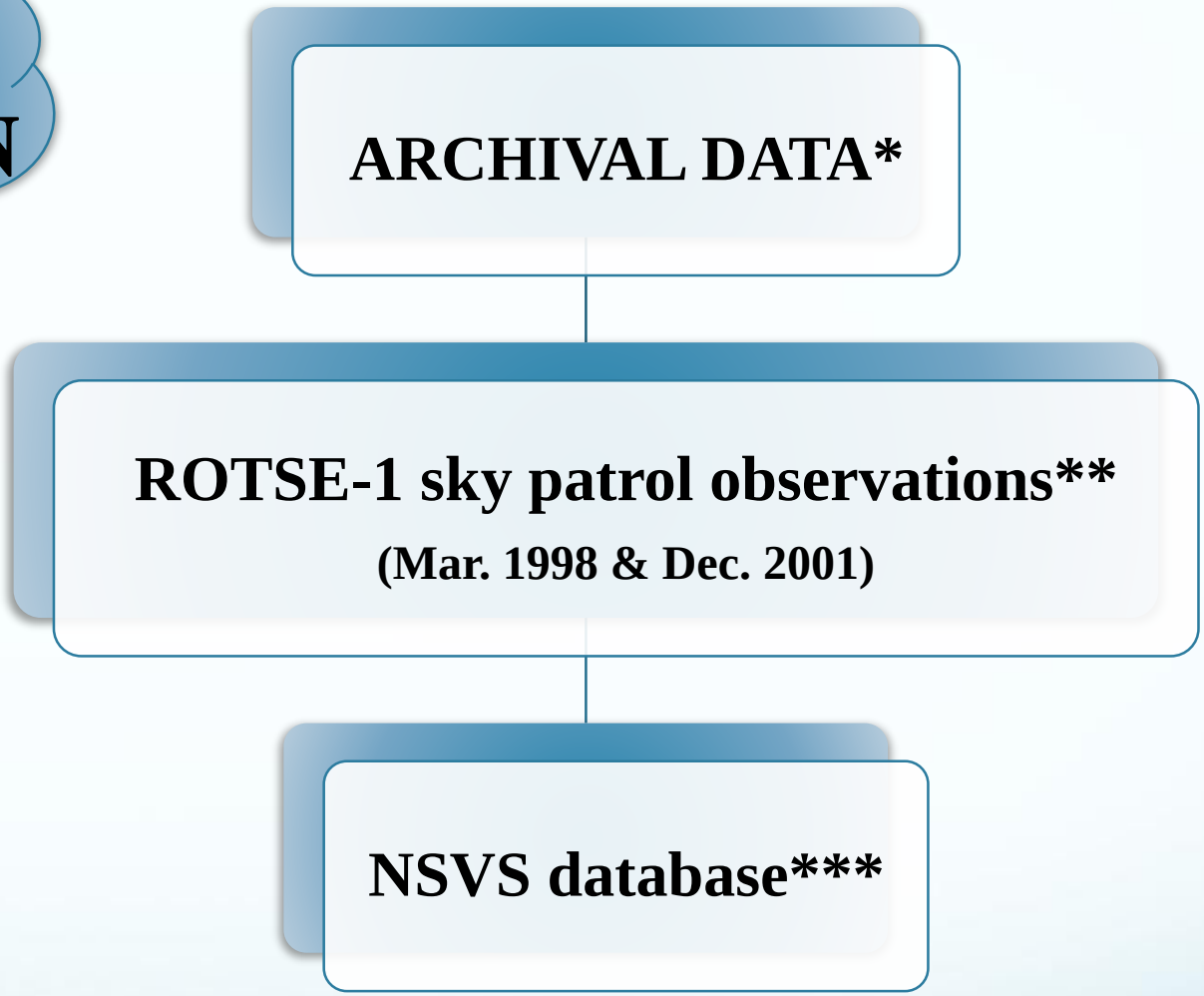


Standard IRAF* Procedure for both photometry and spectroscopy.
Analysis was performed using Wilson-Devinney (WD) method.**

*IRAF is distributed by the National Optical Astronomy Observatory (operated by AURA & NSF).

** Van Hamme, W., & Wilson R. E., 2003, ASPC, 298, 323.
Wilson, R., E., & Devinney, E., J., 1971, Ap.J., 166, 605.

DATA COLLECTION



Analysis was performed using Wilson-Devinney (WD) method.**

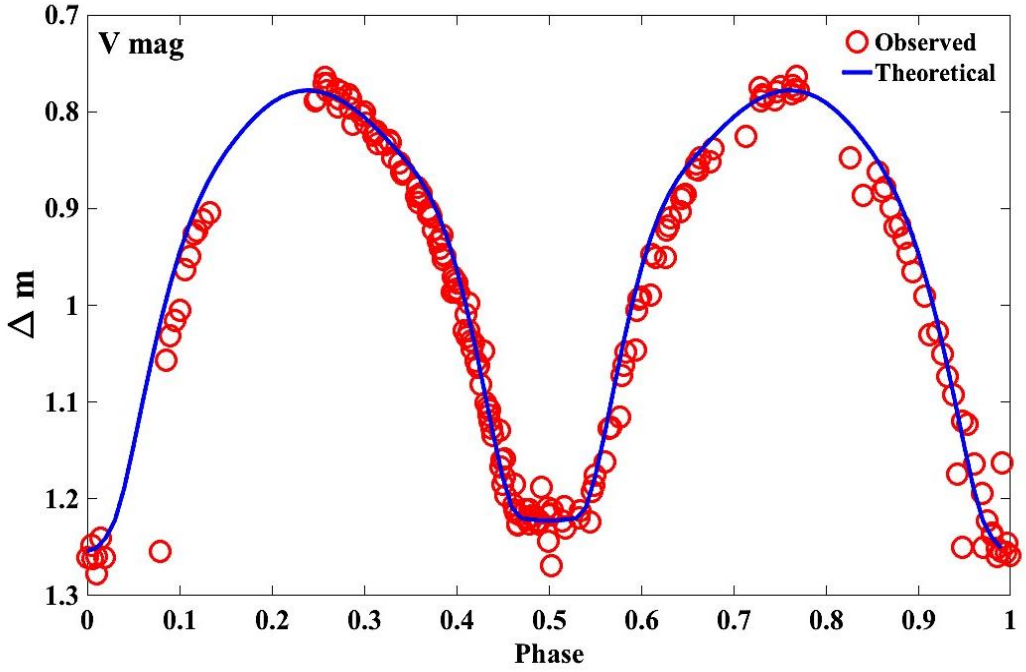
*Gettel S.J.; Geske M.T. & Mckay T.A., 2006, A.J.,131, 621

** Akerlof, C., et al. 1994, ApJ, 436, 787 & http://www.rotse.net

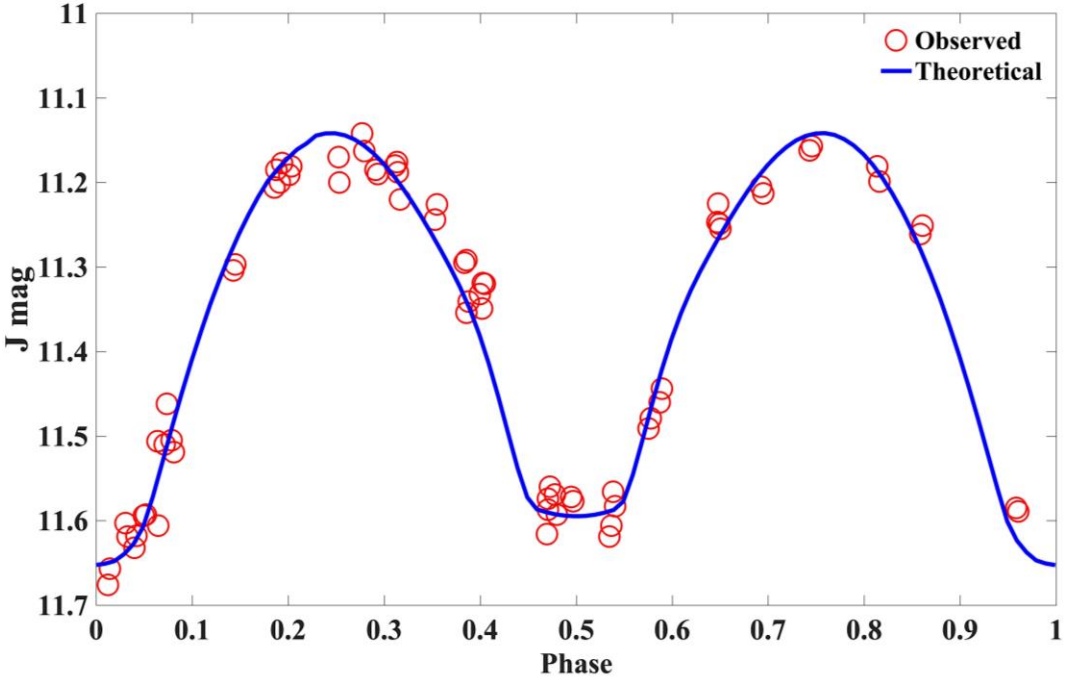
*** Hoffman D.I.; Harrison T.E.; Mcnamara B.J., 2009, A.J., 138, 466

RESULTS

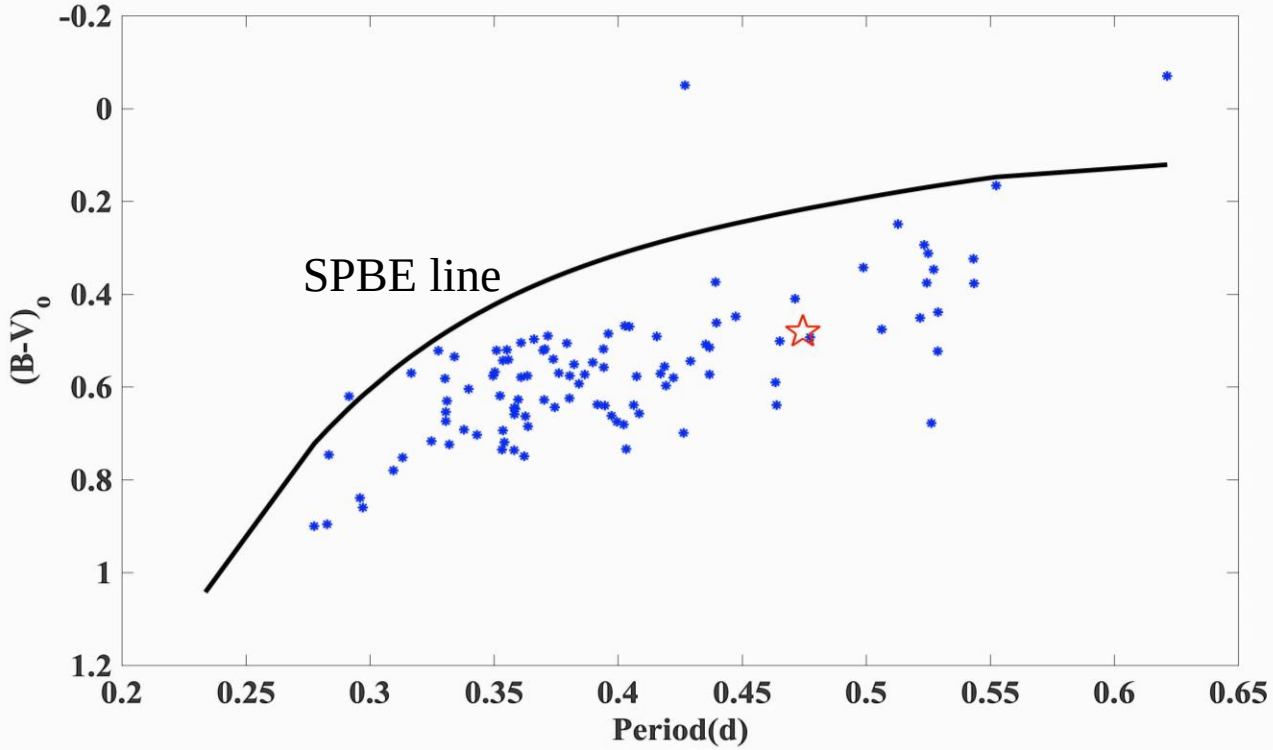
PARAMETERS	CURRENT STUDY (2016 OBSERVATIONS)	NSVS (Gettal et al., 2006)
$T_{e,h}$ °K	6450	6450
$T_{e,c}$ °K	6381±12	6327±13
q	0.229	0.178
i°	83.008	83.986
Ω	2.25365	2.07920
fill-out factor (%)	35.77	70.60
L_h	0.78598	0.80771
L_c	0.21402	0.19229
$\Sigma w(o-c)^2$	0.00075	0.00167
Spectral Type	F5-F8	F5-F8
Activity	No O'Connell effect and Good thermal contact but marginal geometric contact	No O'Connell effect, Good thermal contact and geometric contact.



Observational data (2016)



Gettel et al., 2006 data

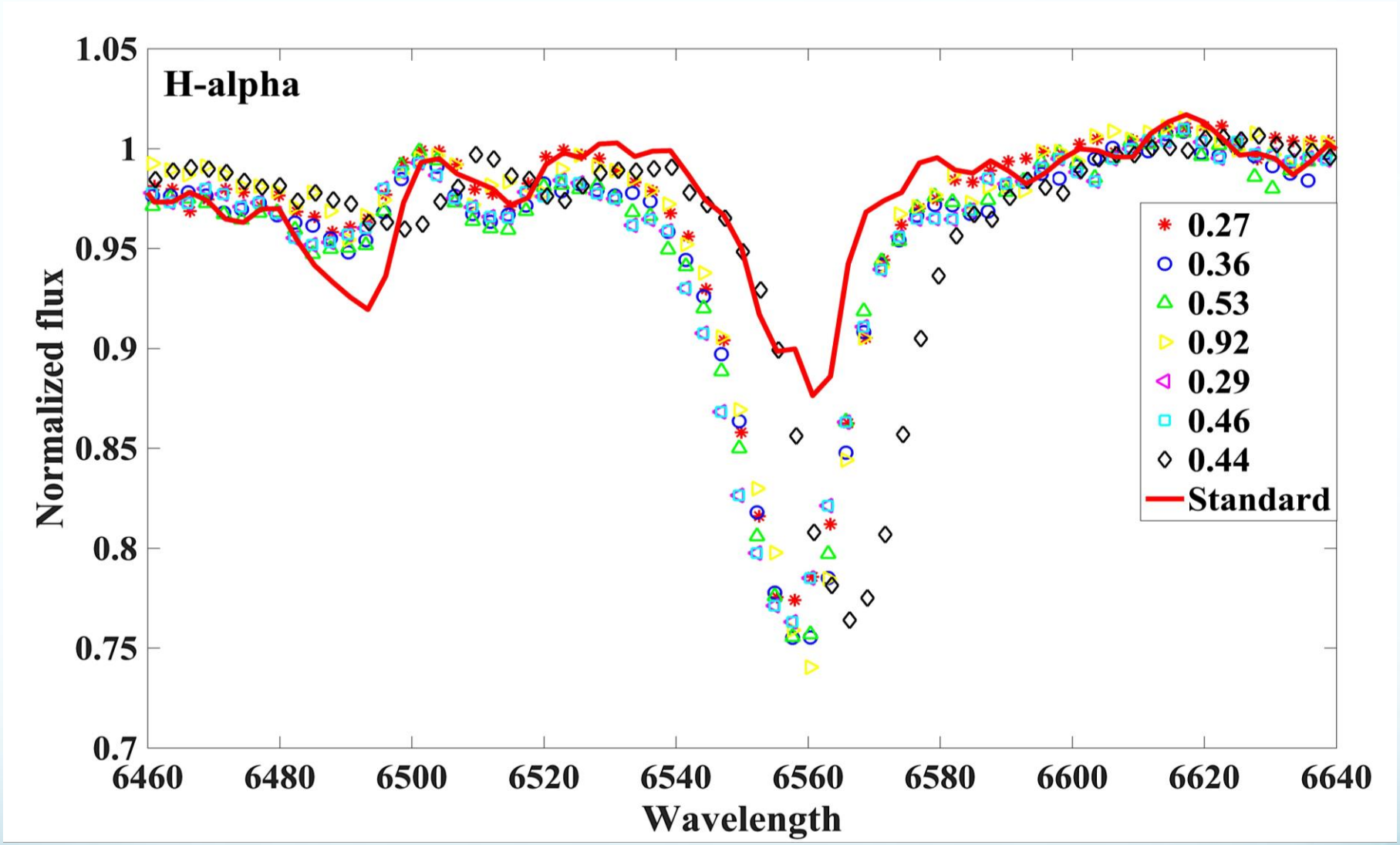


The position of the variable in study with respect to SPBE line (Short Period Blue Envelope) in the Period – Color study* on well studied contact binaries***, shows that it is evolved system.**

***Eggen, O.J., 1967, Mem. Roy. Astr. Soc., 70, 111**

**** Rucinski, S.M., 1998, Astron. J., 116, 2998**

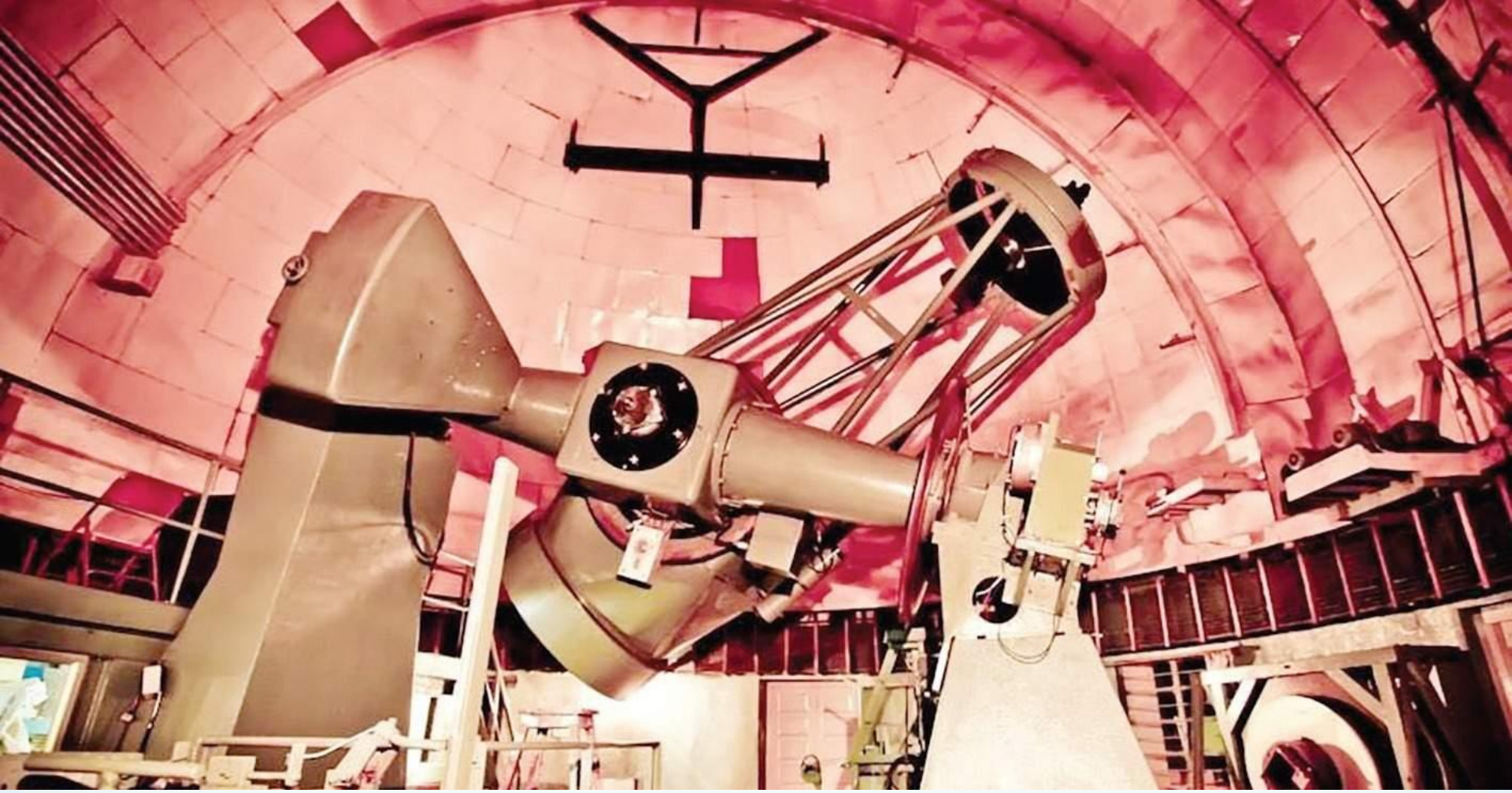
***** Terrell, D., Gross, J., & Conney, W. R. Jr. 2012, AJ, 143, 99**



D Shanti Priya & J Rukmini, 2016, JAA, 37, 3.
S. Kandulapati, S. P. Devarapalli, & V. R. Pasagada, MNRAS, 2015, 446, 510.
K. Diana & M. Dragomir, BlgAJ, 2011, 15, 77.
O. Vilhu & C. Maceroni, IAUS, 2007, 240, 719.

SUMMARY

- An interesting variable which seems to undergo transition between deep contact and marginal contact phases.
- Long term period study will confirm the Thermal Relaxation Oscillation model (TRO).
- Variation in H-alpha absorption profile is observed inspite of absence of O'Connell effect which may be either due to mass transfer or chromospheric activity.
- The parameters derived are typically similar to well-studied binaries AQ Psc and DY Cet.



Telescope at Rangapur observatory under OU's Astronomy department

Thank You