

*Abstract:*

*Context*

*Aims*

*Method*

*Results*

*Introduction:*

- Importance of DSCT stars
  - Able to calculate physical parameters
  - Stellar models
- Relationship of DSCT to HADS and multi-periodic HADS(B)
- Describe rarity of HADS(B) triple-mode
  - Only 6 known in our galaxy. Find papers describing discovery.
- Mention VSP and its goal
- Conclude with aim of the paper (Will be refined as the paper takes shape)
  - Present results of analysis of 3 pulsating variables found with R1.

*Observations/Photometry:*

- Mention all surveys used during analysis. Most likely to be SWASP, CRTS, ASAS, NSVS, R1
- Quick summary of R1 hardware

*Analysis:* Contains 3 subsections.

- I. ROTSE1 J223159.77+135641.9 [DSCT]
- II. ROTSE1 J232708.22+371216.9 [HADS]
- III. ROTSE1 J232056.45+345150.9 [HADS(B)]

**BIG DECISION:** Will all datasets (NSVS, CRTS, SWASP, ASAS, R1) be kept separate during analysis? Comparisons between frequencies from each dataset could then be displayed in a table. Downside to this approach is the period/frequency will not be as accurate. SAO always recommends the inclusion of multiple datasets for better accuracy. Does this apply for an extensive analysis such as this?

**POTENTIAL PROBLEM?:** Because the same data will not be used (CRTS, NSVS, and R1 combined), a different period from what is published in VSX will result. Is it okay to publish something outside of what was stated?

*Calculations to be done for each variable:*

- ***Ephemeris formula (Done on all 3 variables)*** – Relates the pulsation period, first maximum time observed, and the number of elapsed periods since first observation. Often calculated when new data are collected. Used for observation purposes.
- ***Physical Parameters (Done on all 3 variables: See analysis in S.J. Jafarzadeh et. al 2017)***
  - Absolute Magnitude
  - Color Index (B-V)
  - Effective Temperature
  - Spectral Type based on bolometric correction (BC)
  - Luminosity
  - Mass
  - Radius

- ***Multi-frequency Analysis***
  - Primarily done for HADS(B). May include analysis for other HADS and DSCT. Frequencies will be included when deemed statistically significant based on Breger condition of  $SNR > 4.0$ . Box size for SNR will be 20% of frequency (subject to change upon further reading).
  - O-C Analysis (done for HADS and DSCT if possible)
  - Determine Frequency change in non/radial modes (if possible).
  - For the HADS(B) only, determine if a 44% increase is seen in amplitude of the second harmonic over a 3 year period. May be able to confirm a hypothesis made by another group/paper.
- **TBD: Explore differential photometry for plots**

*Discussion:*

- DSCT review
  - Depends on results
- HADS review
  - Depends on outcome of results
- HADS(B) review