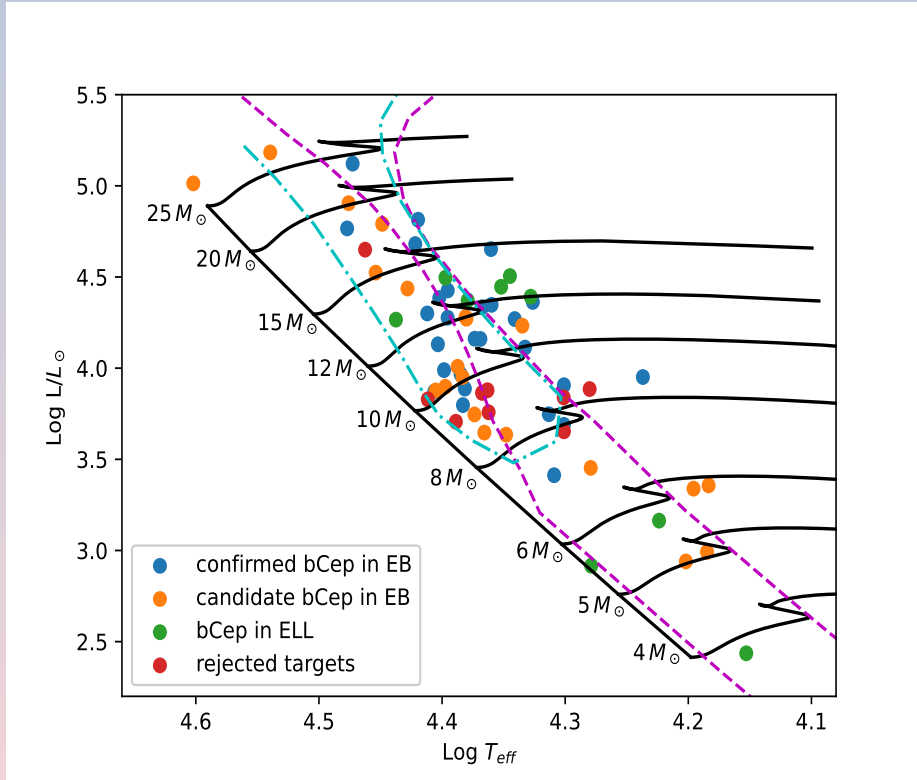


Asteroseismology of massive stars in eclipsing binary systems

- Christian Ikechukwu Eze
- PhD student, CAMK PAN
- Annual Meeting, Jan 22, 2024
- Supervisor: Prof. Gerald Handler

β Cephei Pulsators in eclipsing binaries observed with TESS



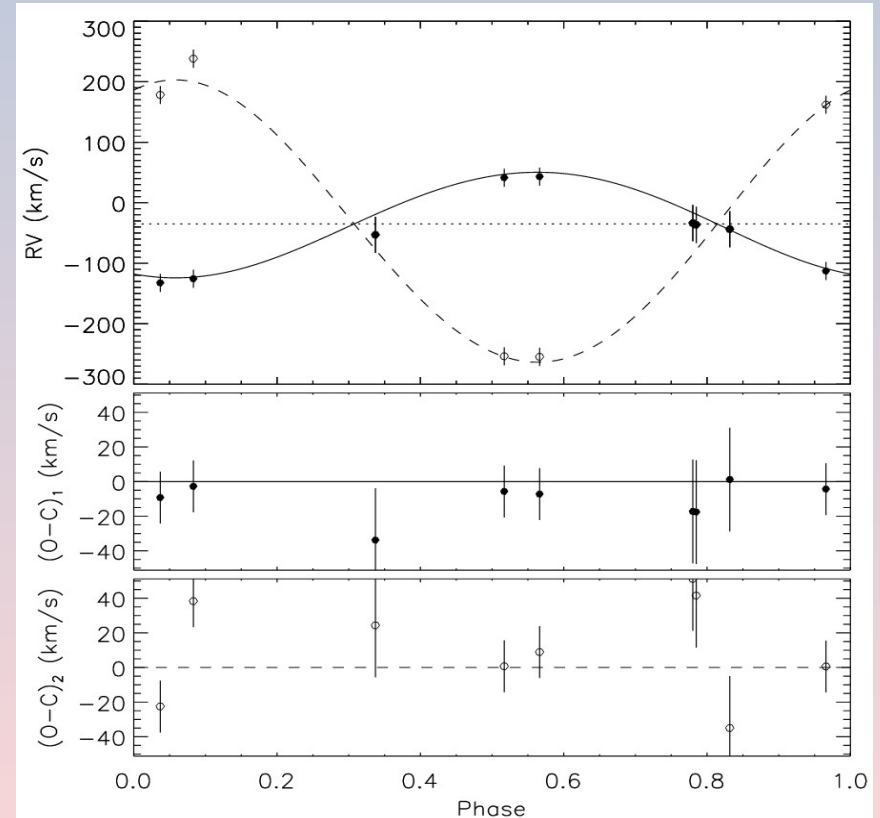
- 78 β Cep in EB (59 new discoveries; 43 -definite and 35 - candidate pulsators in EB).

Eze & Handler (2024), ApJS, 272:25

Spectroscopic Analysis (Eze+ In prep)

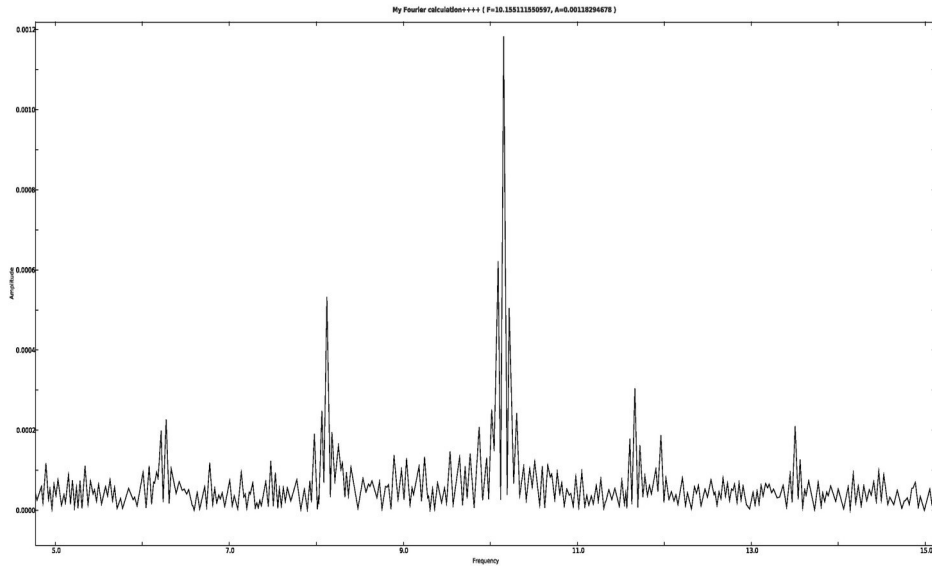
- Observations:
 - SALT (HRS), CTIO (CHIRON), HERMES and SPO
- RV extraction and fitting:
- RVFit (Iglesias-Marzoa et al., 2015)
- Disentangling with FD3 binary (Ilijić et al., 2004) for SB2
- Atmospheric solutions using Tlusty NLTE BSTAR2006 grid and H and He lines.

- Orbital Variability

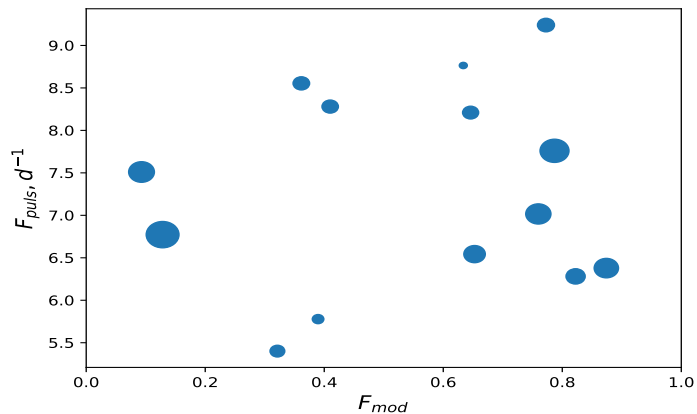
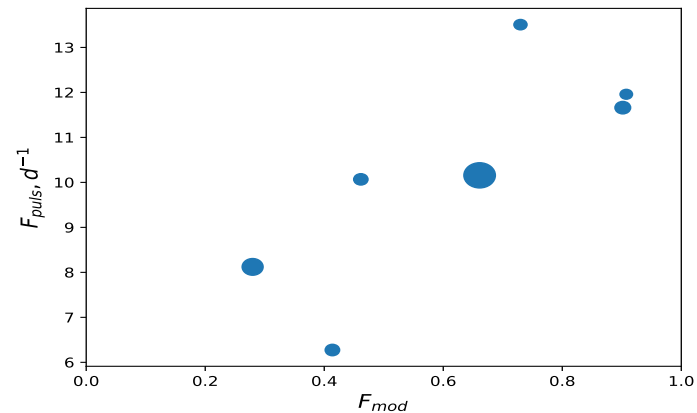


Example figure of radial velocity fit of one of the SB2 binaries in our sample

Asteroseismic Analysis



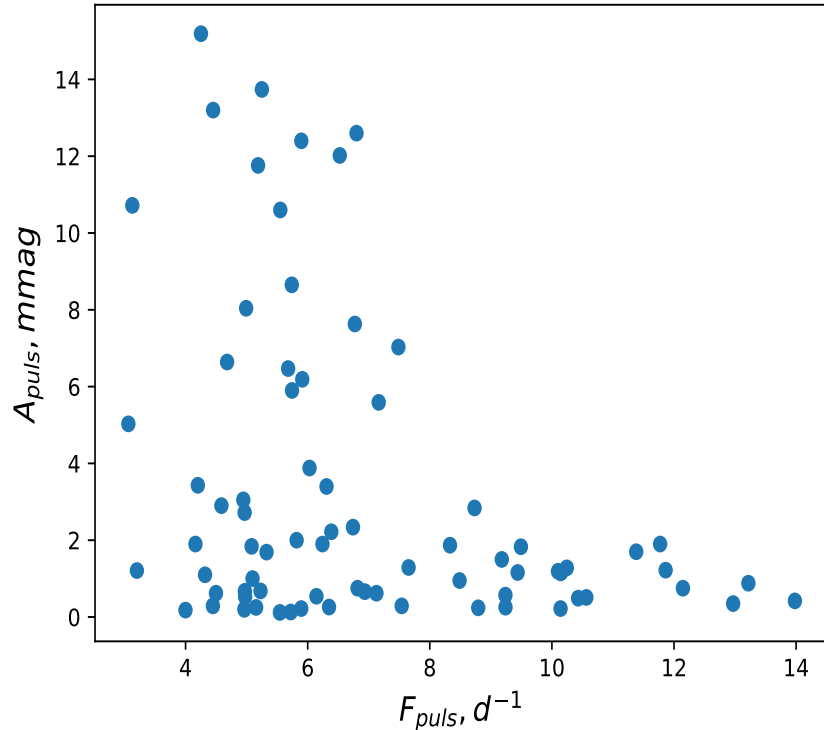
	Frequency (d^{-1})	Amplitude (μmag)	Phase
F1	10.1568	0.0011732	0.4307
F2	8.1218	0.0005161	0.5606
F3	11.6611	0.0002879	0.0082
F4	6.2737	0.0002431	0.5371
F5	10.0676	0.0002392	0.6719
F6	11.9588	0.0001806	0.8381
F7	13.5063	0.0002005	0.8029



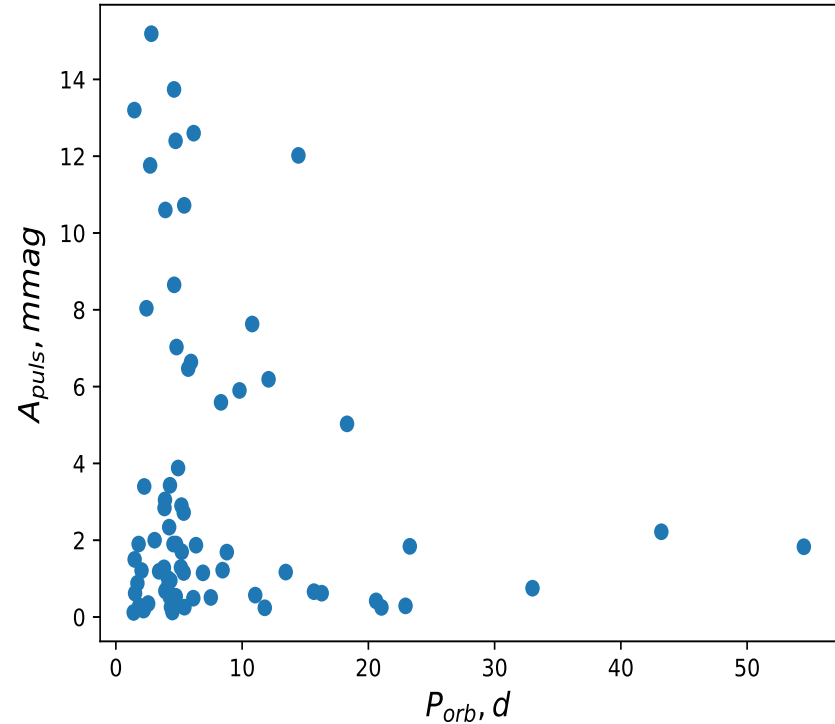
Multicolour photometric observations conducted using SAO 1.0 m telescope for mode identification are currently being reduced.

Echelle Diagrams of V1166 Cen (urp) and V1216 Sco (lrp)

Ensemble Pulsation Analysis



Frequency-amplitude relation for β Cep p modes



Period-pulsation amplitude relation for our sample of β Cep pulsators in EB

Conferences, workshops, summer schools and grant

- International conferences: 4 talks and 1 poster (AFAS, LAMOST-Kepler/TESS, EAS, TASC/KASC, KOPAL)
- national Conference: 1 talk (KonDokPAN)
- 2 summer schools (MESA Down Under and Porto Summer school on Asteroseismology)
- Co-organised 6th Young Astronomers Meeting, CAMK and FAST4Future online summer school on Astronomy.
- NAWA Bekker grant (BPN/BEK/2024/1/00049)

Publications

- C.I. Eze, G. Handler (2024). β Cephei pulsators in eclipsing binaries observed with TESS. **ApJS, 272(25): 22.**
- C.I. Eze, G. Handler (2024). Photometric sample of early B-type pulsators in eclipsing binaries observed with TESS. **Contributions of the Astronomical Observatory Skalnaté Pleso, 54(2): 70-74.**
- C. I. Eze, G. Handler, F. K. Alicavus, T. Pawar, and A. Miszuda (2024). Characterizing the variability of a sample of massive stars in eclipsing binaries. **Submitted to the Contributions of Astronomical Observatory Skalnaté Pleso (caosp) as a refereed conference paper**
- A. Miszuda, C. I. Eze, F. K. Alicavus, C. Johnston, and G. Handler (2024). Eclipsing binary systems with β Cephei components: V1216 Sco. **Submitted to the Astronomy & Astrophysics.**

Thank you