

Annual Report 2023

Krzysztof Hełminiak

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CAMK Toruń

Publications

- Kahraman Alicavus F., Pawar T., et al. 2023, MNRAS, 520, 1601
"Comprehensive spectroscopic and photometric study of pulsating eclipsing binary star AI Hya"
- Moharana A., et al. 2023, MNRAS, 521, 1908
"Detached eclipsing binaries in compact hierarchical triples: triple-lined systems BD+442258 and KIC 06525196"
- Moharana A., et al. 2024, MNRAS, 527, 53
"Solaris photometric survey: Search for circumbinary companions using eclipse timing variations"
- Mistry P., et al. 2023, AJ, 166, 9
"VaTEST. II. Statistical Validation of 11 TESS-detected Exoplanets Orbiting K-type Stars"
- Currie T., et al. 2023, Science, 380, 198
"Direct imaging and astrometric detection of a gas giant planet orbiting an accelerating star"

Observations

- VLT/SPHERE Normal proposal (12h), PI: Hełminiak
- SALT/HRS Normal proposal (18h), PI: Hełminiak
- SALT/HRS Long-Term (4 sem.) proposal, PI: A. Moharana
- 60 hours of observing time on the SMARTS-1.5m/CHIRON (funded by A. Moharana)
- TESS Guest Investigator Program in Cycle 6

Accepted for 2024:

- Subaru/SCEXAO+CHARIS (2n)
- VLT/SPHERE (9h)

Presentations

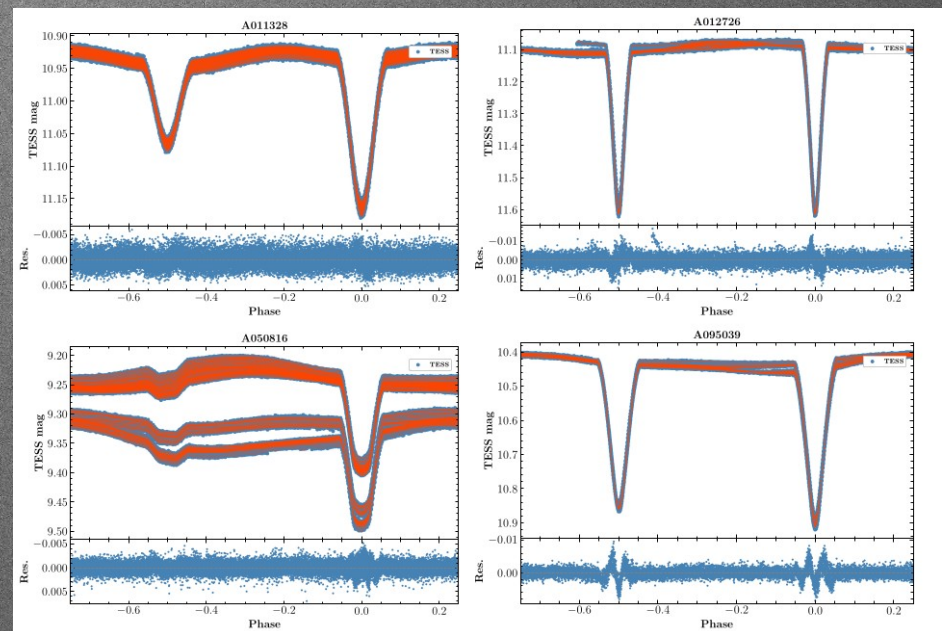
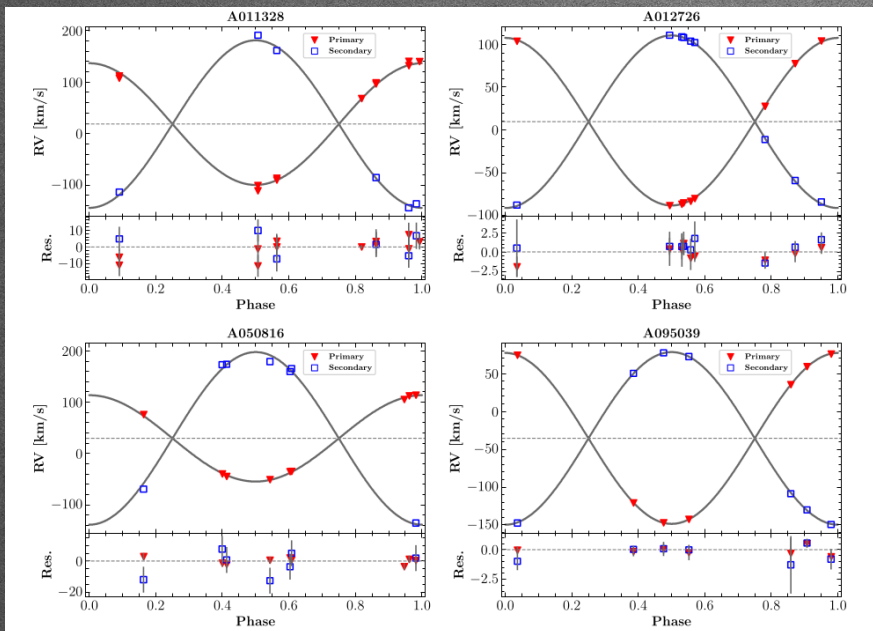
- Conferences:
 - "Science Highlights from SALT", Warsaw
Stellar characterisation of ARIEL targets
 - XLI Zjazd PTA (PAS General Assembly), Toruń
12 years of "CRÉME de la crème" of eclipsing binaries
- Seminars:
 - IA UMK Seminar
The ARIEL space mission and the pre-launch preparations by the Stellar Characterisation Working Group

Other

- Ph.D. students: A. Moharana (CAMK), T. Pawar (CAMK), G. Pawar (CAMK), J. Olszewska (AO AMU)
- Member of the SALT Board of Directors since Nov. 2023
- XLI Zjazd PTA (PAS General Assembly), Toruń, 11-15.09.2023, LOC
- Work for the ARIEL (sSWG coordinator) and PLATO missions consortia
- OPUS grants submitted
- Proposal reviews (ESO P113 DPR, Fizeau 2023B)

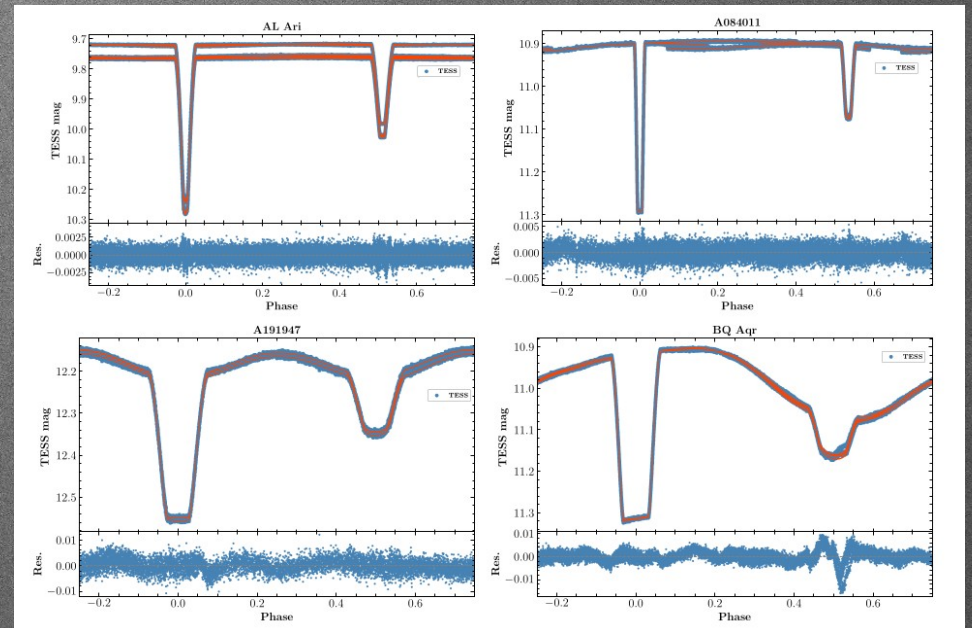
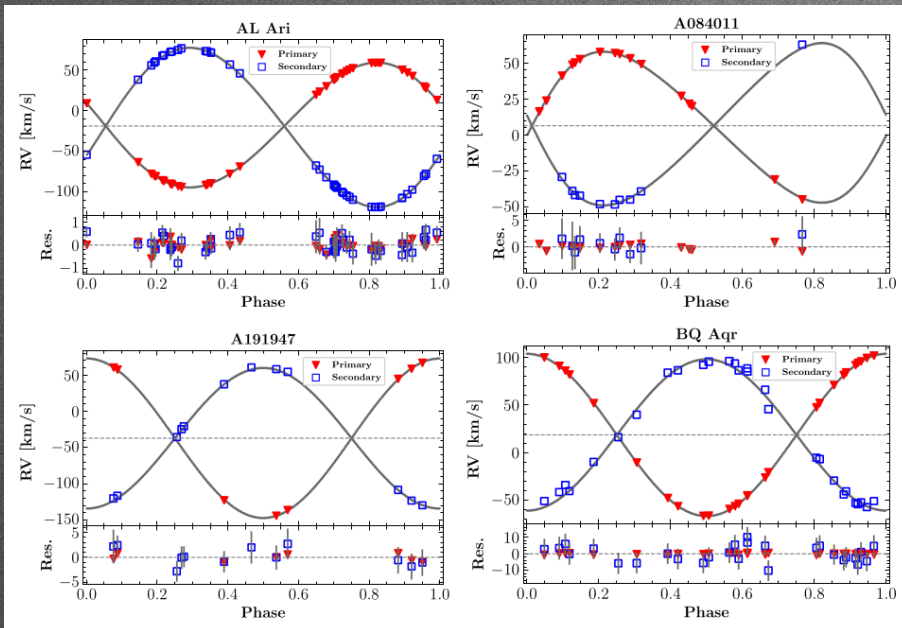
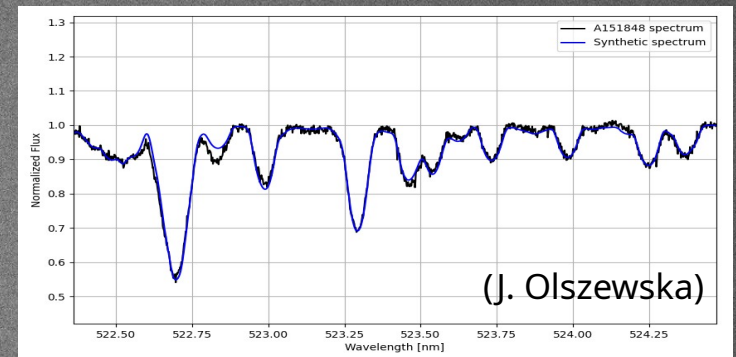
CRÉME: New Results

- Analysis of 17 19 low-mass ($< 0.9 M_{\text{SUN}}$) DEBs:
 - RV modelling: **finished**
 - LC modelling: **finished**
 - Spectral analysis: **ongoing**
 - Isochrone fitting: **pending**



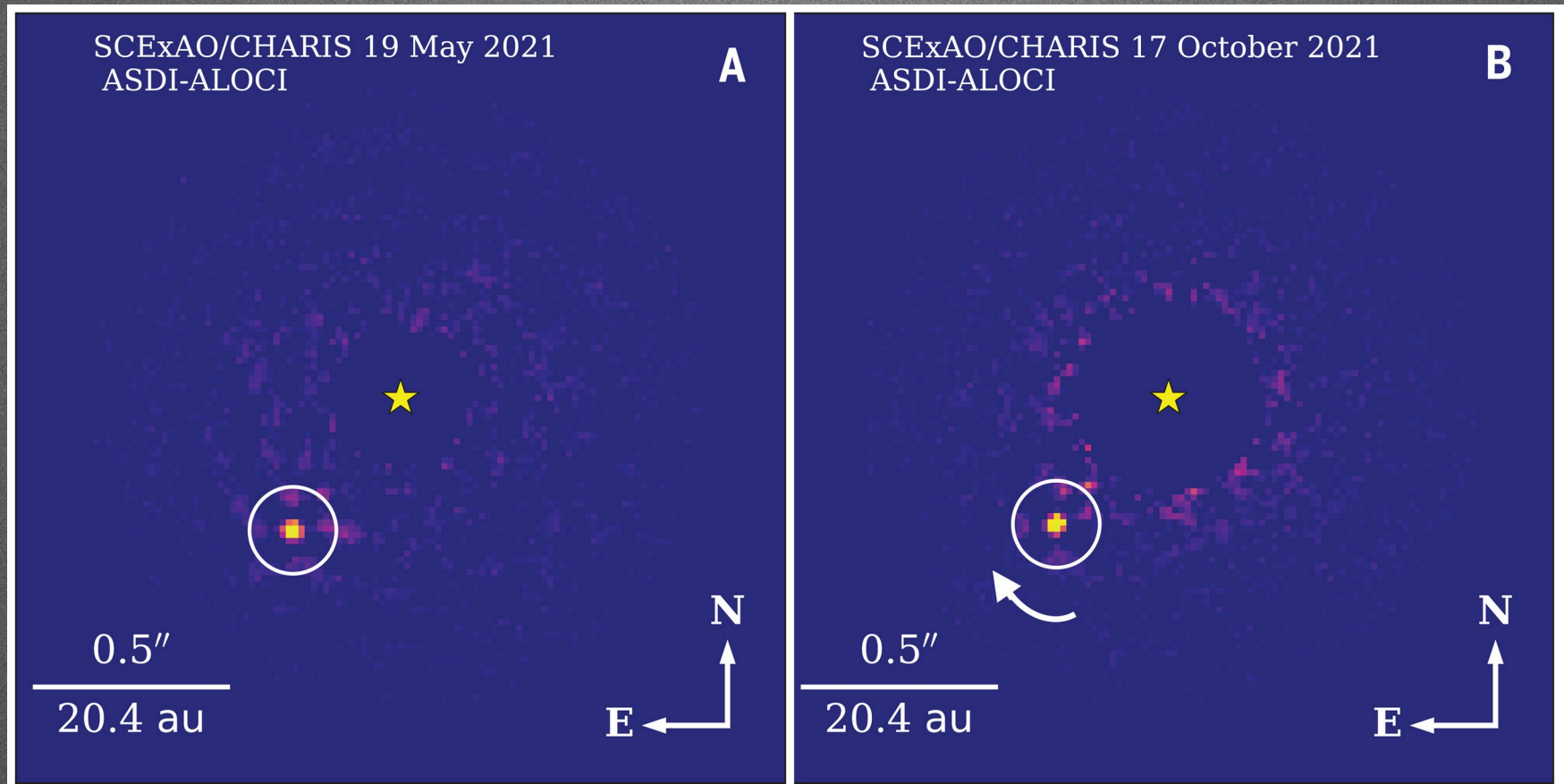
CRÉME: New Results

- Analysis of 11 DEBs with total eclipses:
 - RV modelling: **finished**
 - LC modelling: **finished**
 - Spectral analysis: **finished**
 - Isochrone fitting: **finished**



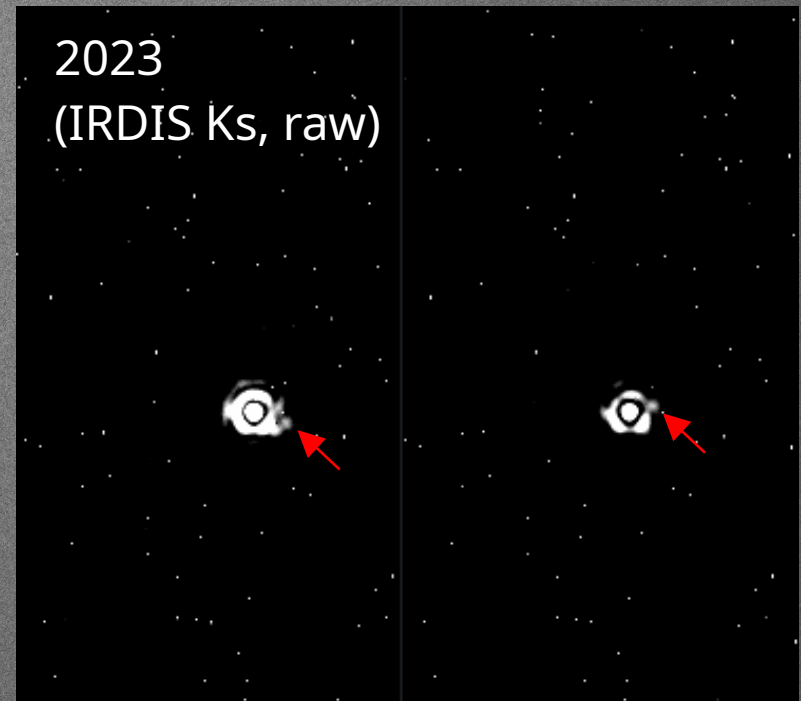
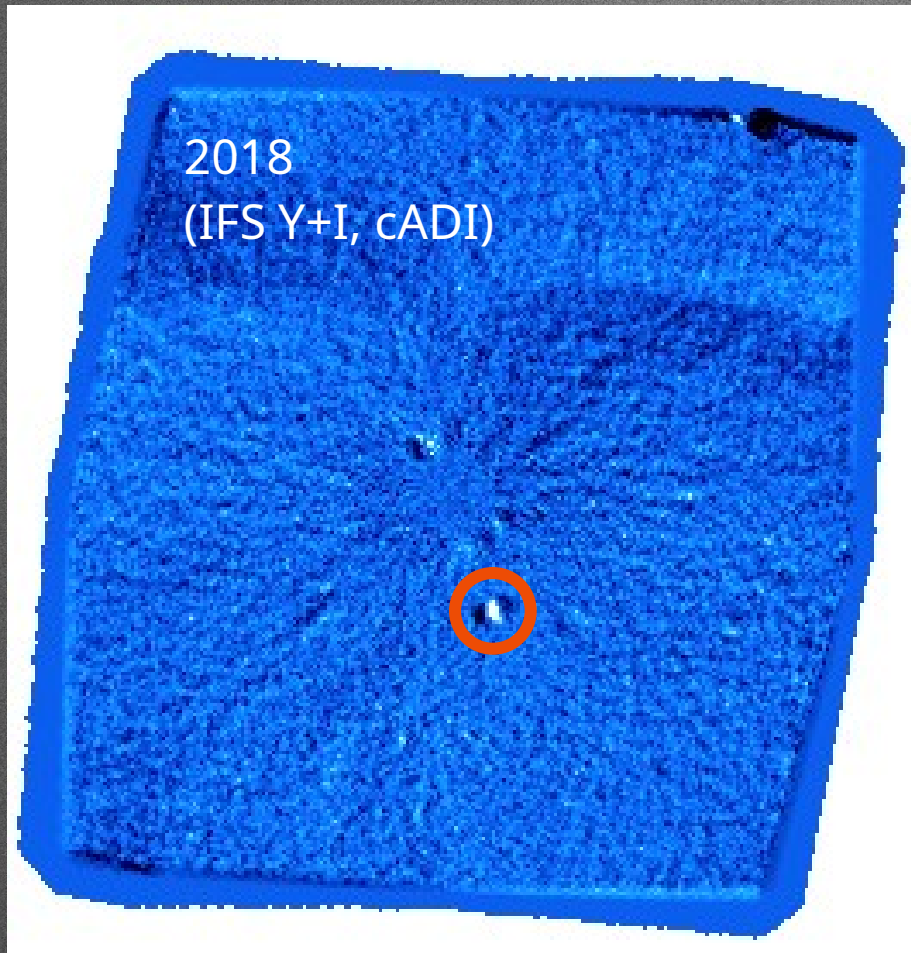
“Accelerating” stars

- **First** directly imaged planet found around an **accelerating star**

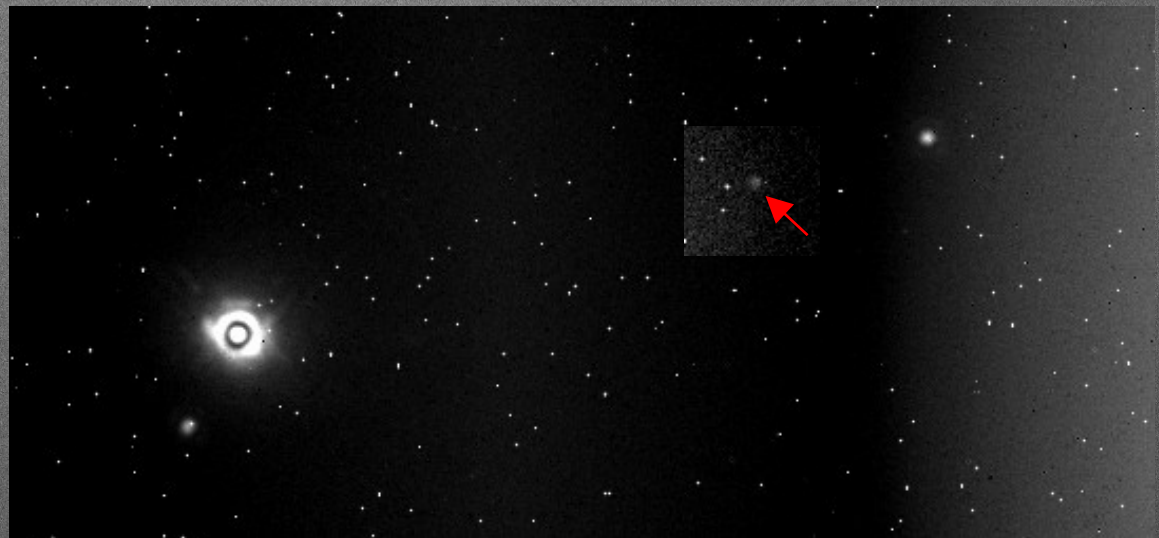
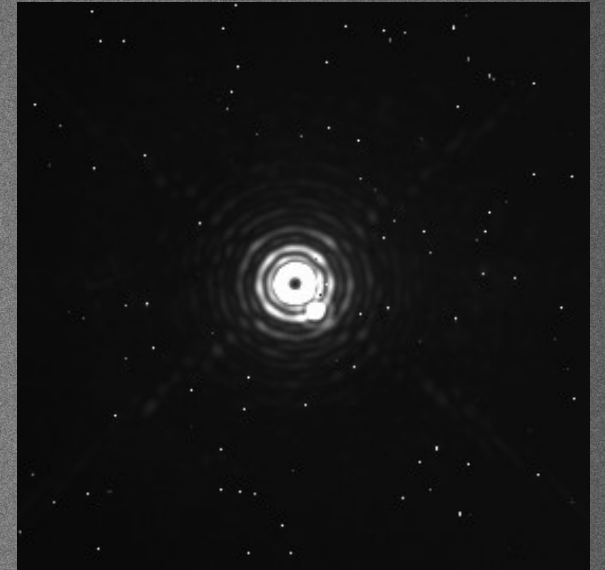
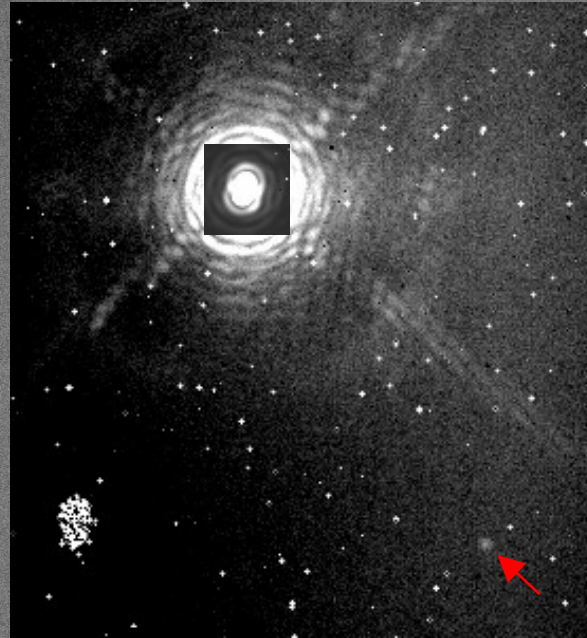


“Accelerating” stars

- Brown dwarf (candidate) around a well-studied, $1.17 \pm 0.91 M_{\text{SUN}}$, 3.47 Gyr old DEB



SPHERE observations 2023



THANK YOU



FOSSILS IN THE FLOOR OF CAMK TORUŃ