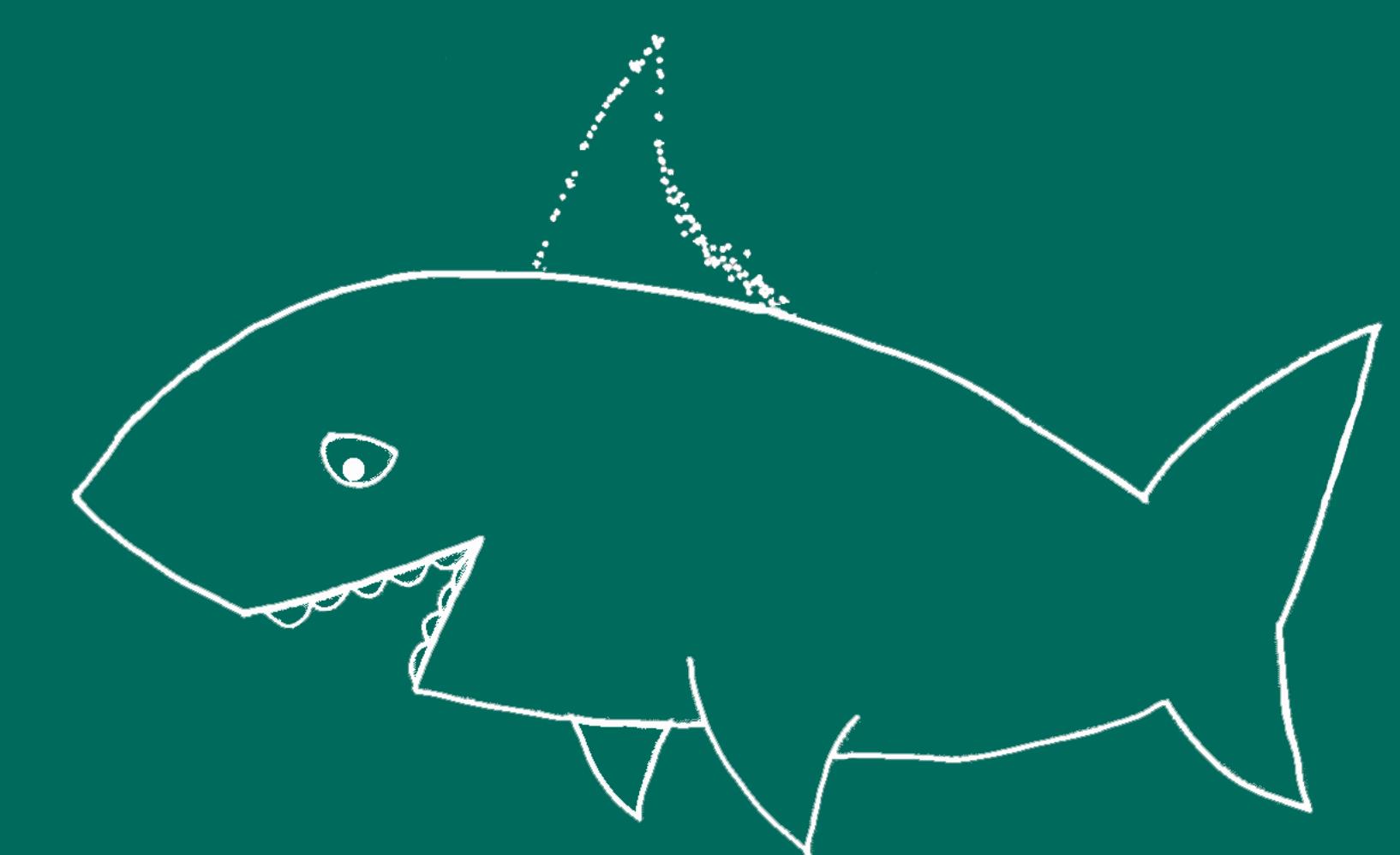


Transiting exocomets detected in broadband light by TESS in the β Pictoris system



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TIMELINE

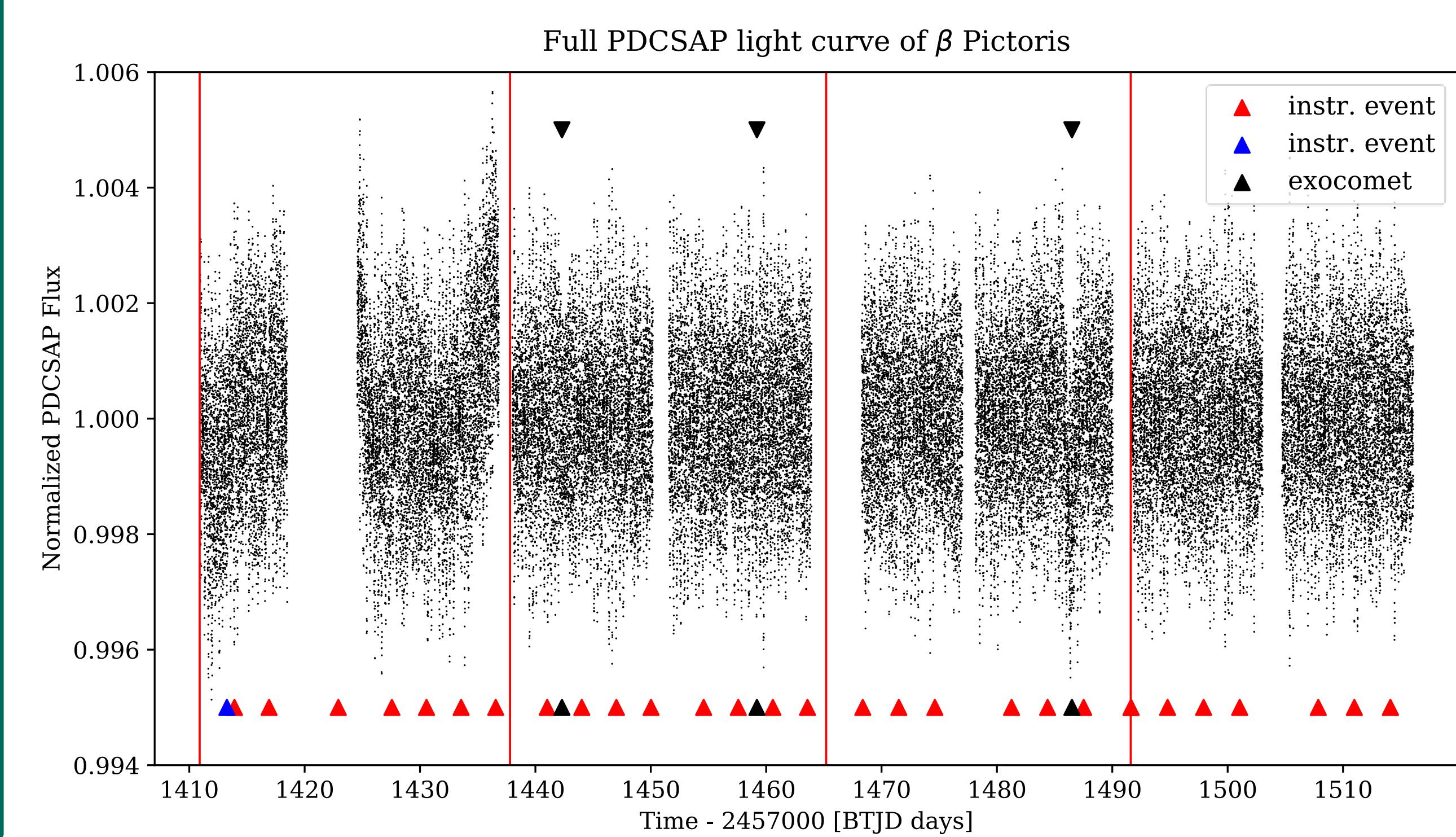
- 1984:** Discovery of an **infrared excess** and a **disc** around β Pictoris (Aumann; Smith & Terrile).
- 1987:** First detection of exocomets with **spectroscopy** (Ferlet et. al.).
- 1999:** Modelling study of exocomet light curves published by Lecavelier et al.
- 2014:** Kiefer et al. analyze several **hundreds of exocomets** in the β Pictoris system in the Calcium K & H lines.
- 2018:** Rappaport et al. discover first exocomets in **photometry** using *Kepler* data.
- 2019:** Zieba et al. discover exocomets around β Pictoris in photometry with **TESS**, which are in agreement with the predictions made 20 years earlier.

TESS OBSERVATIONS

- Sector 4 – 7
- (105 days)
- Oct. 2018 – Feb. 2019
- 2 minute cadence

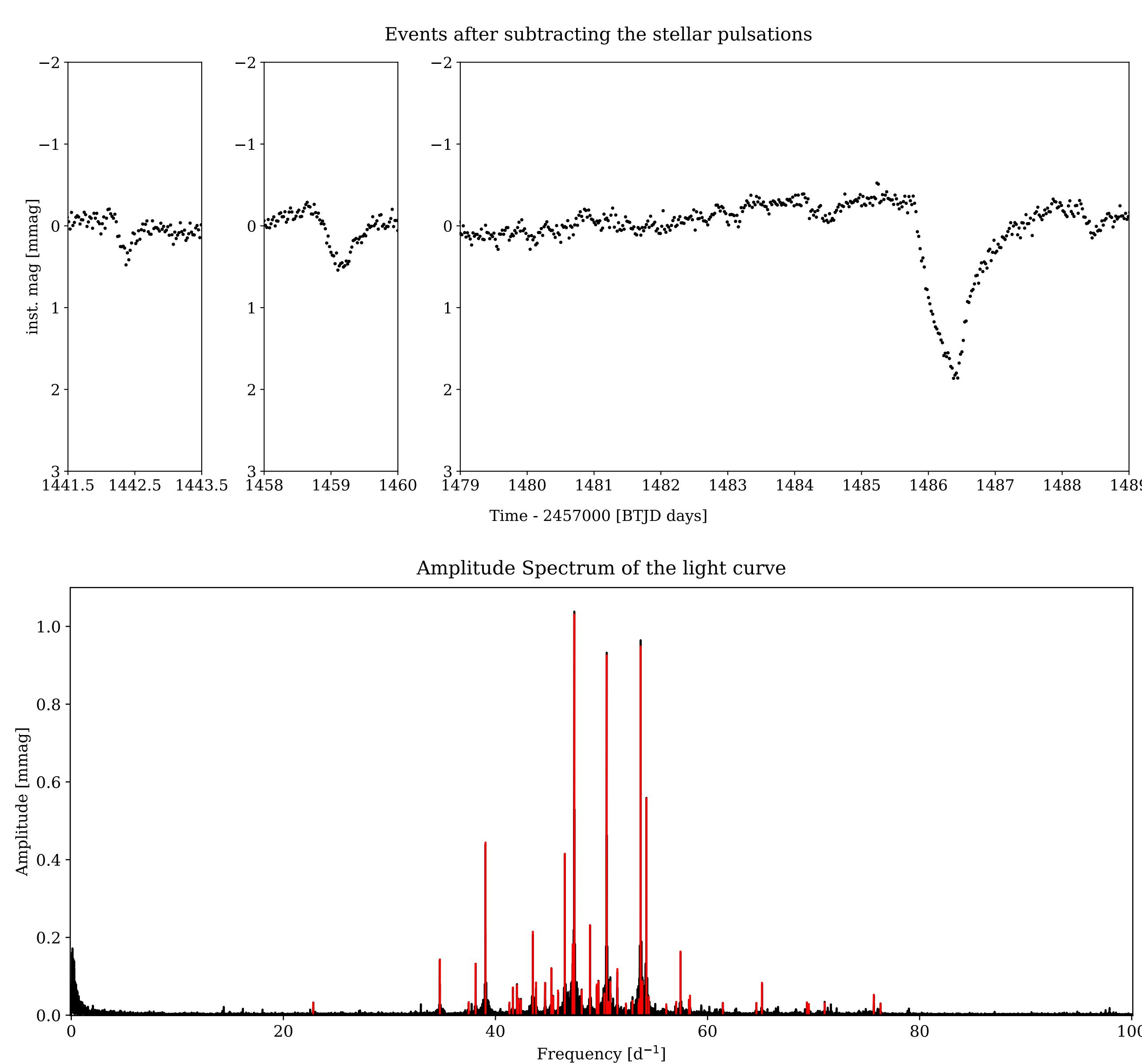
β PICTORIS

- $V = 3.86$ mag, $T = 3.7$ mag
- $d = 19.76$ pc (Gaia Coll. et al.)
- Age ≈ 23 Myr (Mamajek & Bell)
- SpT = A6V

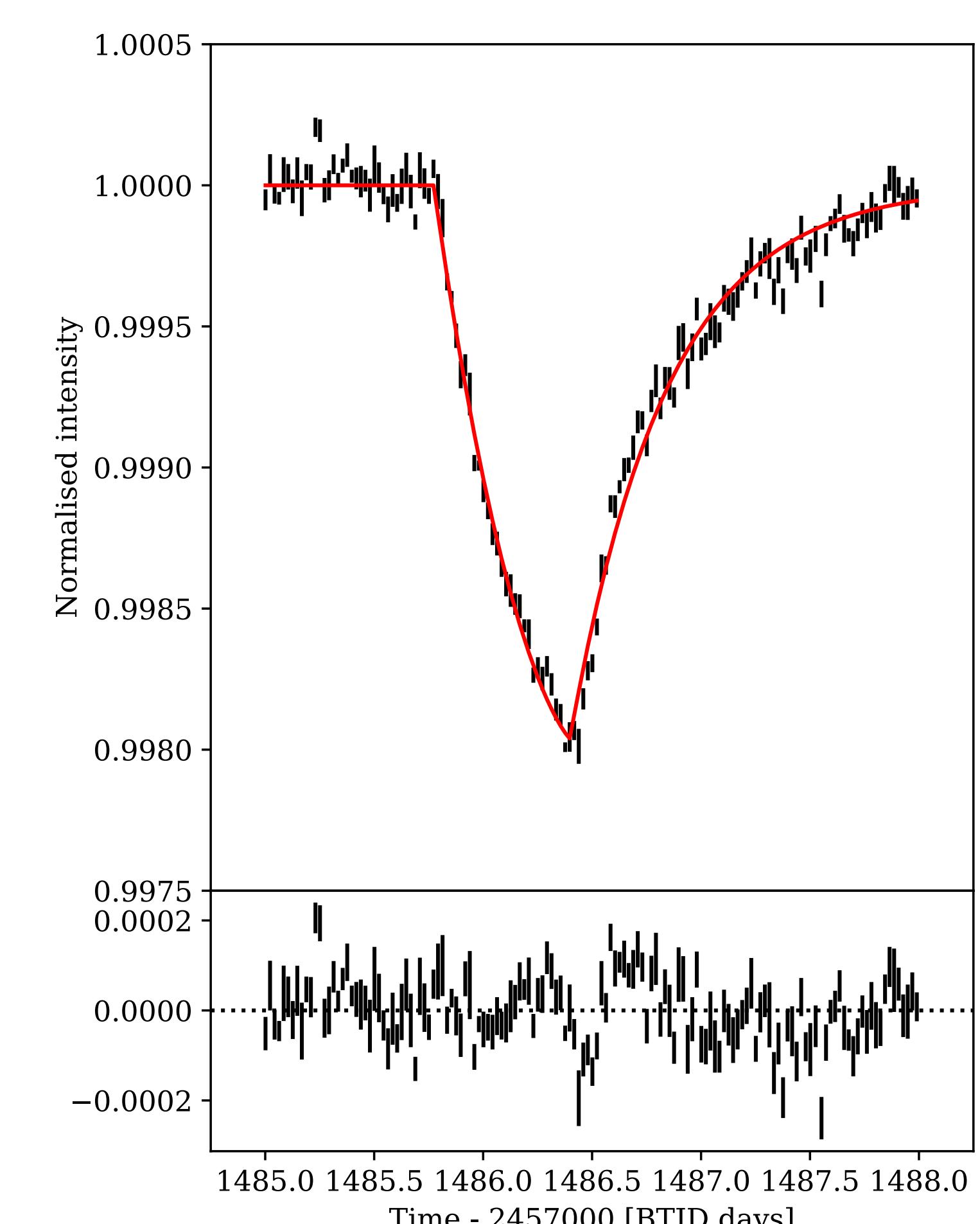


RESULTS

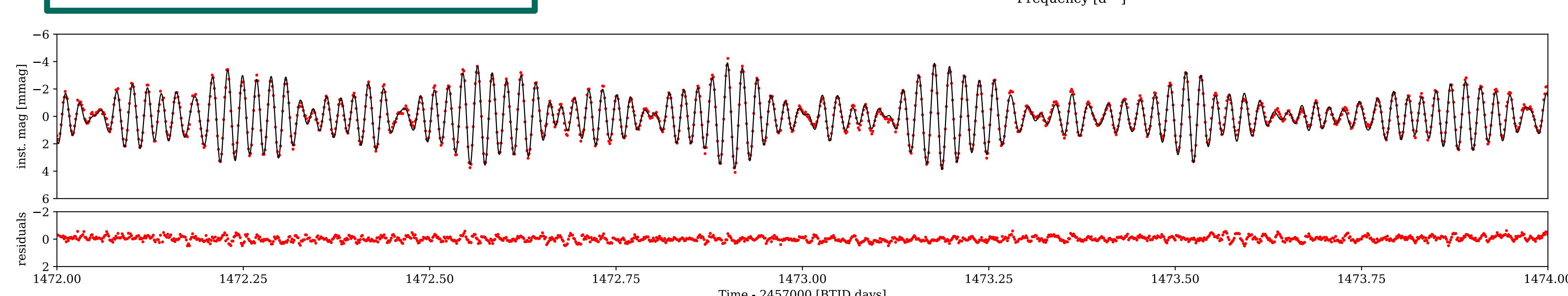
- Observation of **three distinct non-periodic dips** in sector 5 and 6. The biggest clearly shows the **shark fin like shape** expected from an exocomet.
- Identification of **54 δ Scuti type pulsations** of the star confirming prior observations. Many of those were unknown.



Modelling of the biggest event:
exponential decaying optical depth of the tail convolved with limb darkening of the star.



| Parameters | Value | Description |
|--------------------|------------------------------------|----------------------|
| t_{\min} | 1486.290 ± 0.001 d | transit minimum |
| b | 0 (assumed) | impact parameter |
| c_e | $(3.67 \pm 0.04) 10^{-3}$ | norm. const. |
| $1/\lambda$ | $(1.22 \pm 0.04) 10^{-3}$ rad | charact. tail length |
| v_{trans} | $(19.6 \pm 0.1) \text{ km s}^{-1}$ | transverse velocity |



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