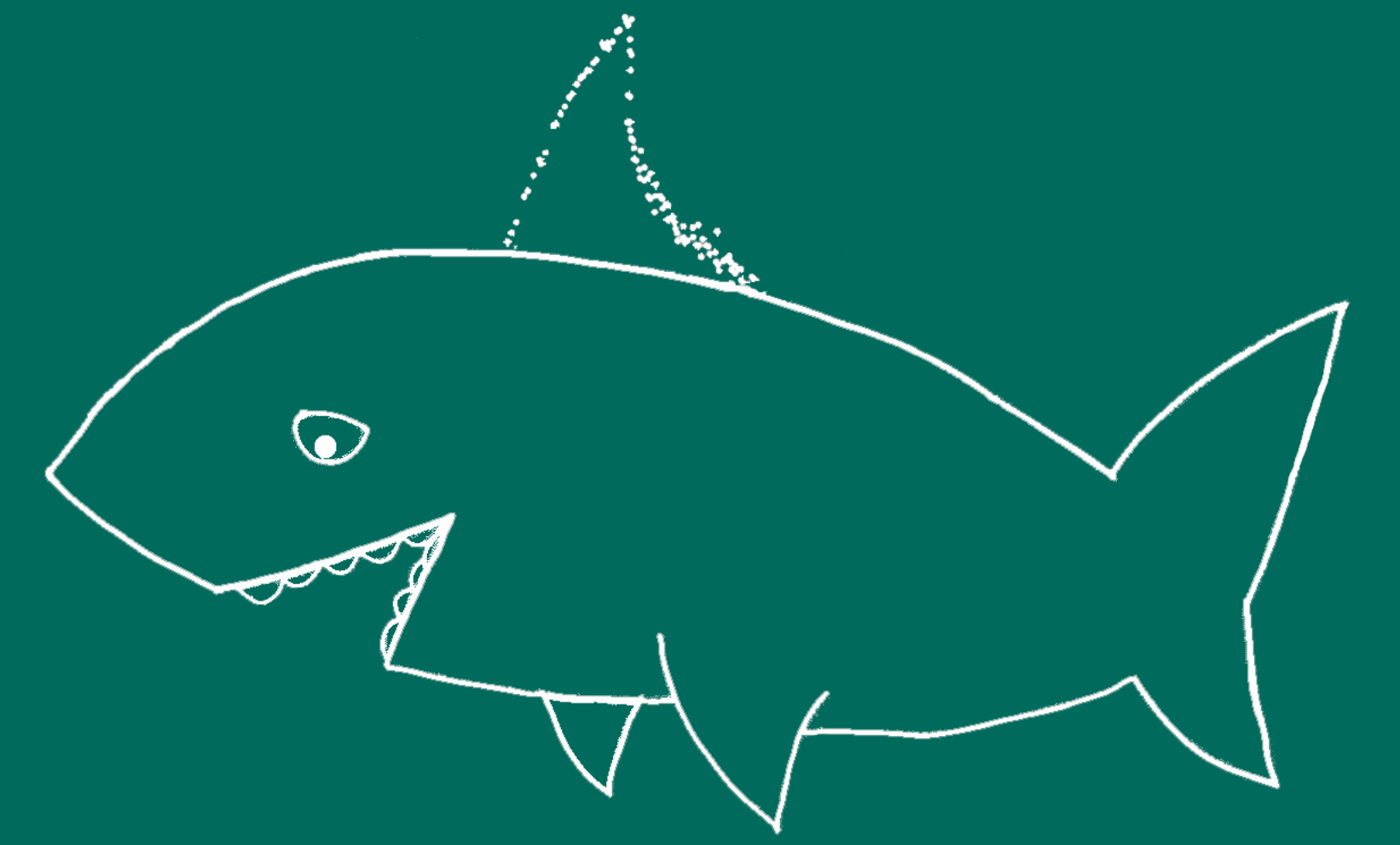


Transiting exocomets detected in broadband light by TESS in the β Pictoris system



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TIMELINE

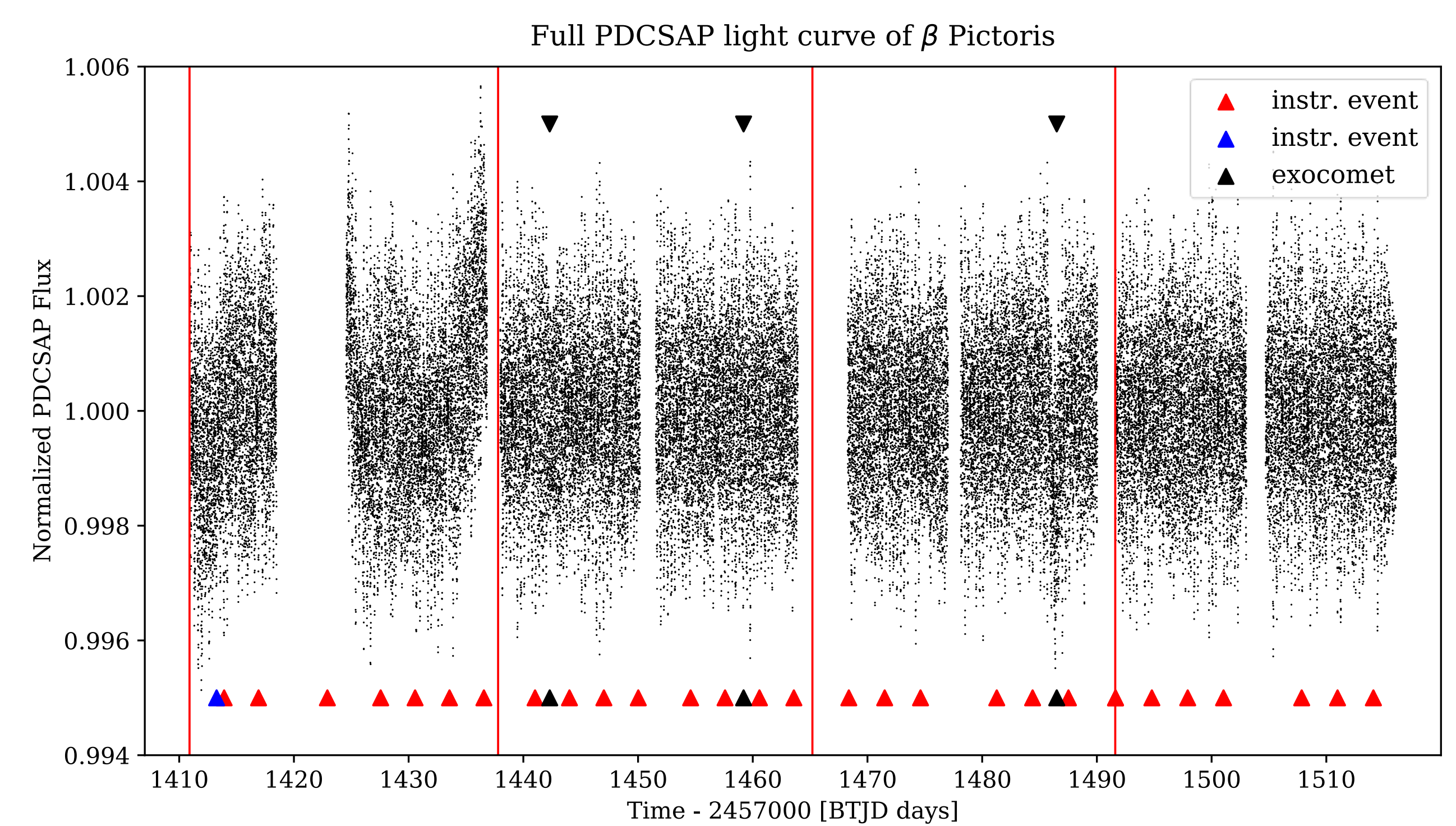
- 1984:** Discovery of an **infrared excess** and a **disc** around β Pictoris (Aumann; Smith & Terrile).
- 1987:** First detection of exocomets with **spectroscopy** (Ferlet et. al).
- 1999:** Modelling study of exocomet light curves published by Lecavelier et al.
- 2014:** Kiefer et al. analyze several **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

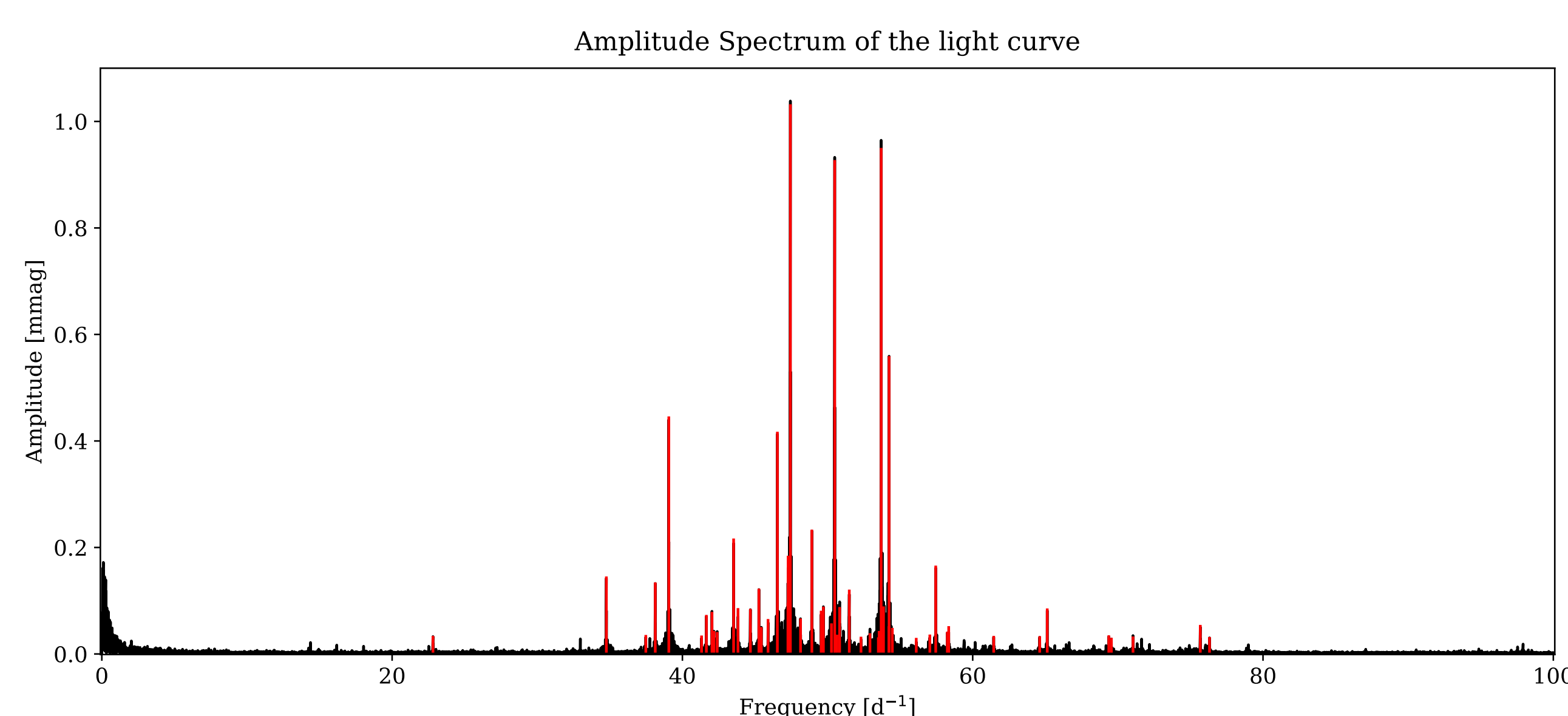
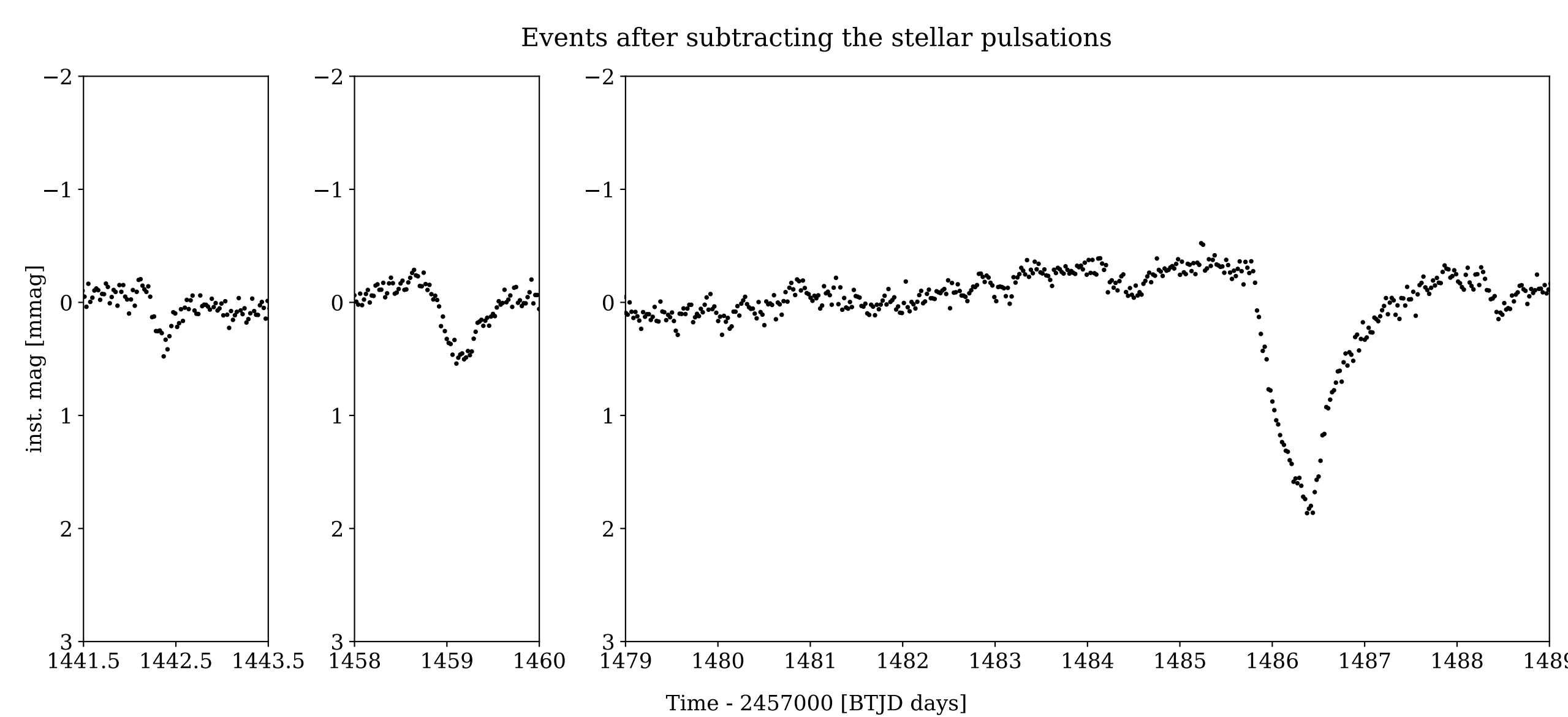
β PICTORIS

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

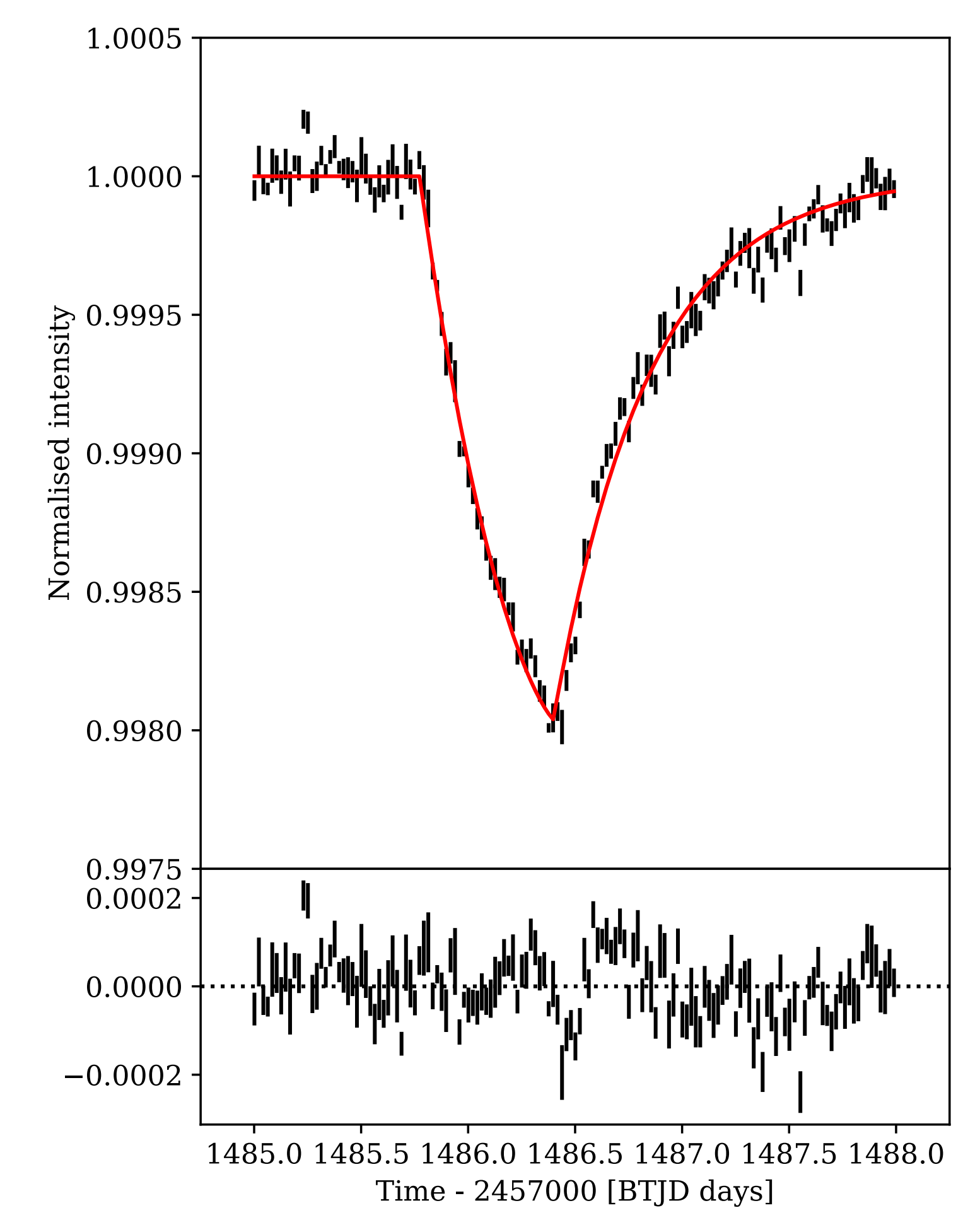


RESULTS

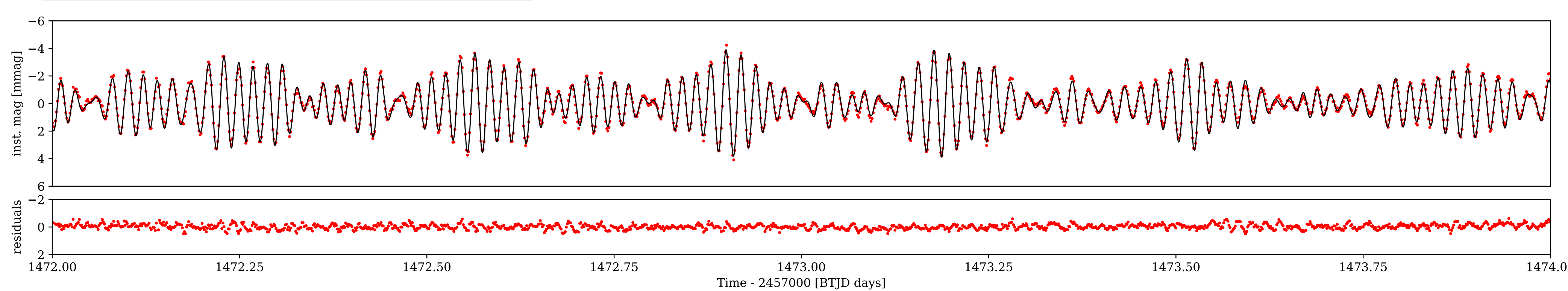
- Observation of **three distinct non-periodic dips** in sector 5 and 6. The biggest clearly shows the **shark fin like shape** expected from an exocomet.
- Identification of **54 δ -Scuti type pulsations** of the star confirming prior observations. Many of those were unknown.



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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