OUTBURSTS AND ECLIPSES ON THE LIGHT CURVE OF SYMBIOTIC SYSTEM AX PERSEI

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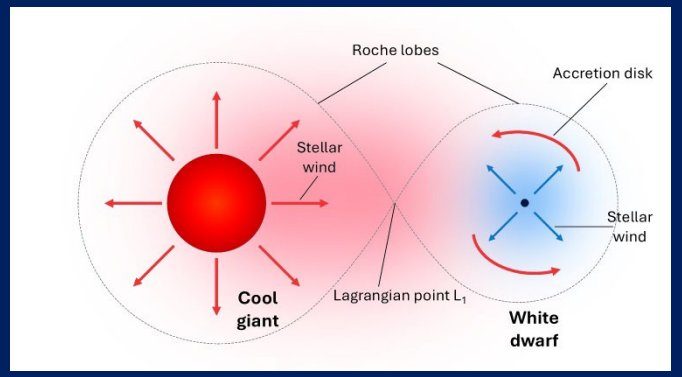
SLOVAK RESEARCH AND DEVELOPMENT AGENCY

THE GOALS OF OUR RESEARCH

- Identification of the outbursts and eclipses on the light curves of the AX Persei in the U, B, V, R_c and I_c filters.
- Their amplitude and duration values determination.
- Comparation of the parameters in different quiescent and active phases.
- Investigation of the specific character of the light curve in the filter I_c.

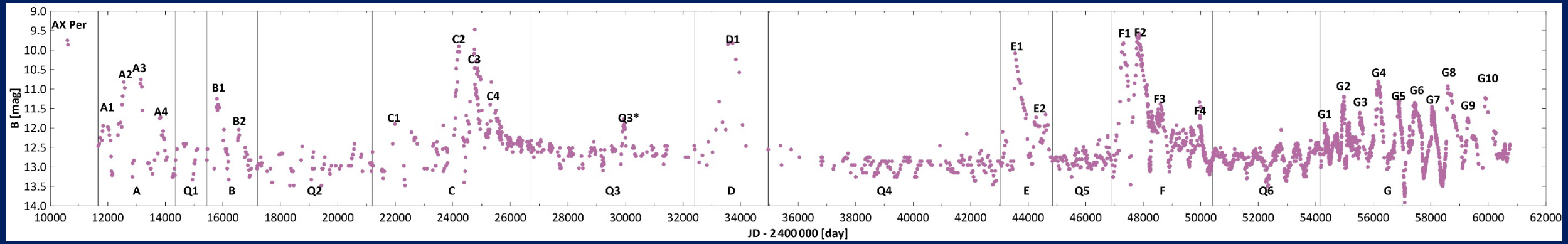
AX PERSEI

- Symbiotic system consisting of a M4.5 III giant and a white dwarf surrounded by symbiotic nebula.
- Classical symbiotic binary – active and quiescent phases.
- Outbursts – the sign of activity, significant photometric and spectroscopic changes.
- Eclipsing character.



The model of symbiotic system.

Light curve of AX Persei in the *B* filter.



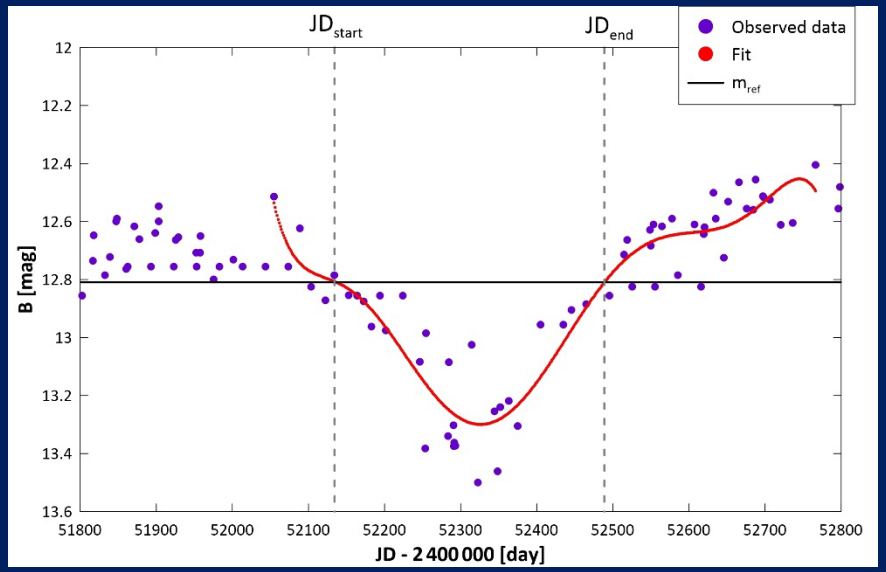
DATA PROCESSING AND ANALYSIS

- **Sources of the photometric data:** available scientific publications – papers, telegrams (Atel, CBET), circulars (IAUC) and the database of American Association of Variable Star Observers* (AAVSO; Kloppenborg 2025).
- Magnitudes in *U, B, V,* R_c and I_c filters; light curves constructed and analysed in the previous research (Mártonfi et al. 2021).

*https://www.aavso.org/

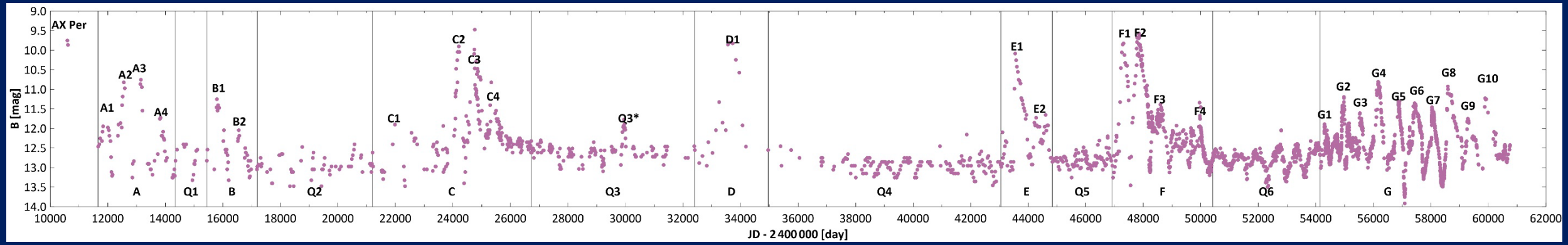
DATA PROCESSING AND ANALYSIS

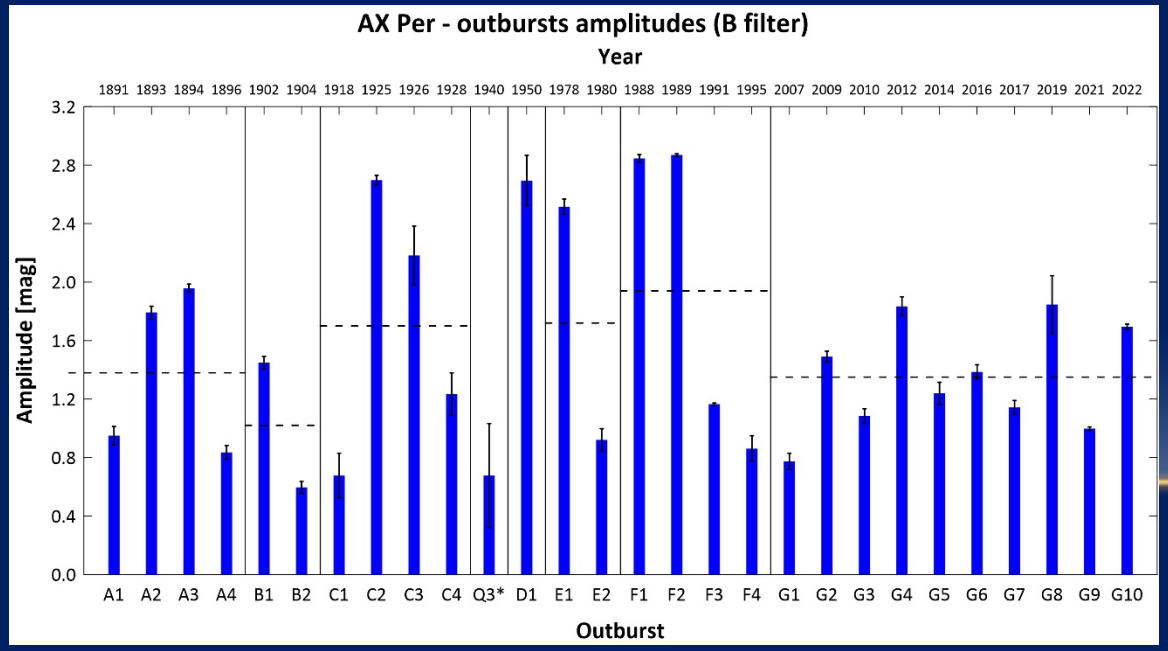
- **JDs and magnitudes (m) of outbursts and eclipses determination:** MAVKA software (Andrych et al. 2020), 3 methods of approximation (polynomial, parabolic spline, asymptotic parabola).
- **Reference magnitudes (m_{ref}):** middle value of the sinusoidal fit (quiescent phases) or the median magnitude (active phases) in the given phase.
- **Amplitudes:** $A = |m - m_{\mathrm{ref}}|$
- **Durations:** $t_{\mathrm{dur}} = JD_{\mathrm{end}} - JD_{\mathrm{start}}$, JD_{end} and JD_{start} are the JDs of discretized fitting function at m_{ref}.
- Differences in the curve I_c.

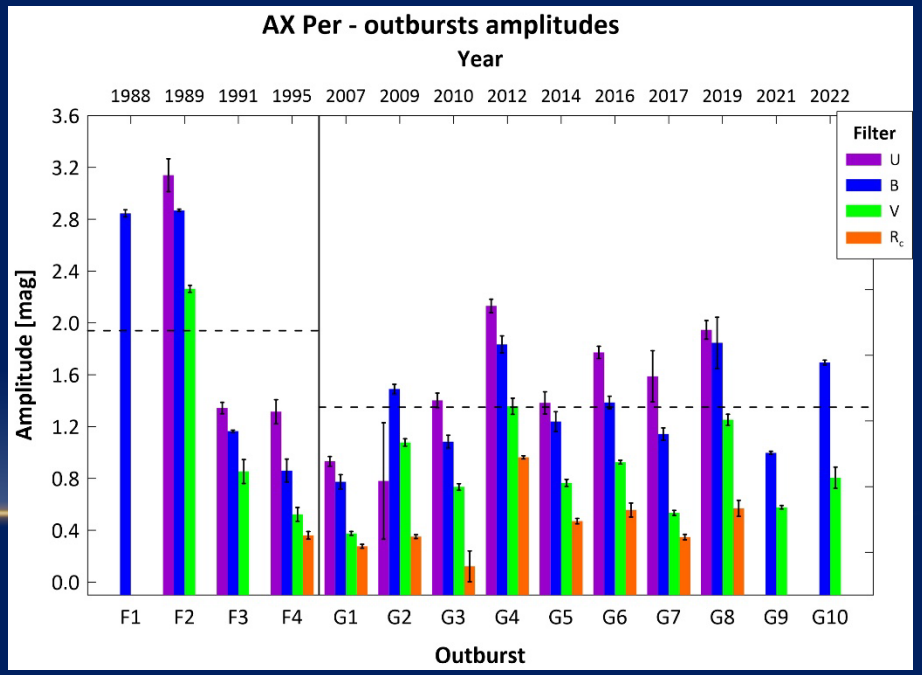


The explanation of the determination of JD_{start} and JD_{end}.

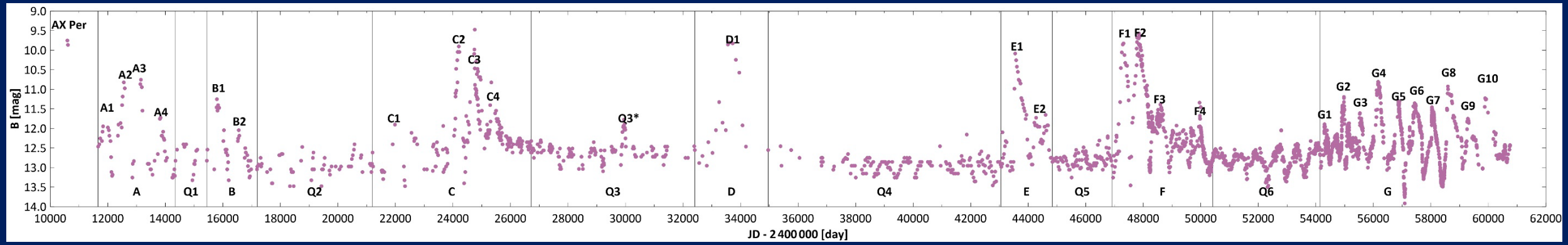
THE RESULTS OF THE RESEARCH
THE OUTBURSTS - AMPLITUDES

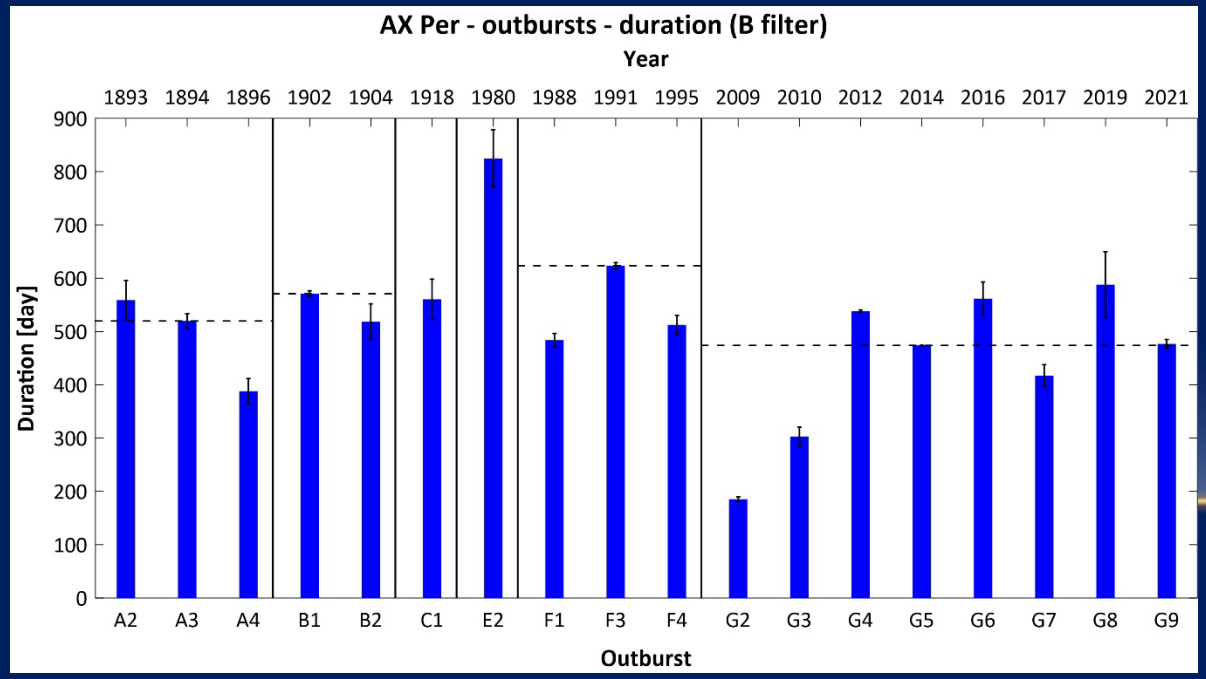


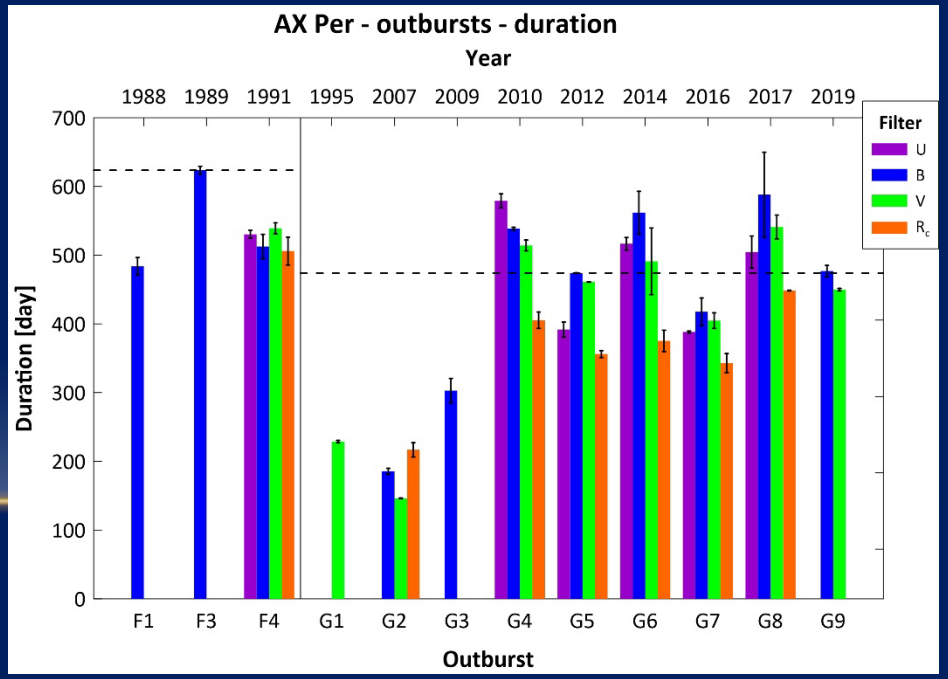




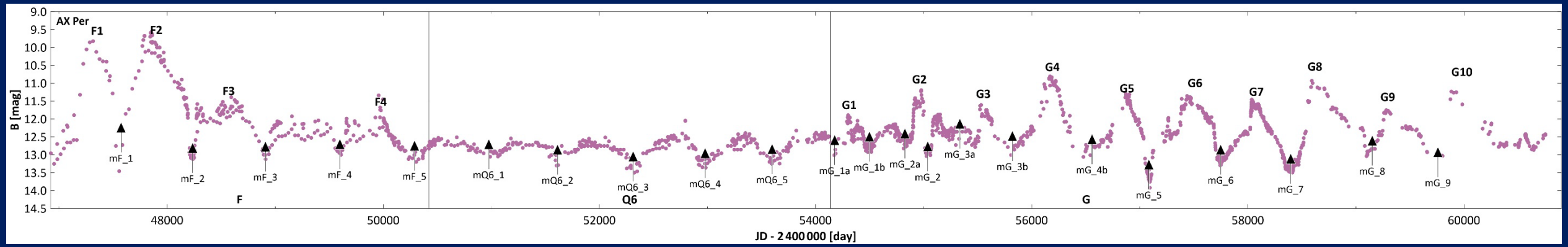
THE OUTBURSTS - DURATIONS

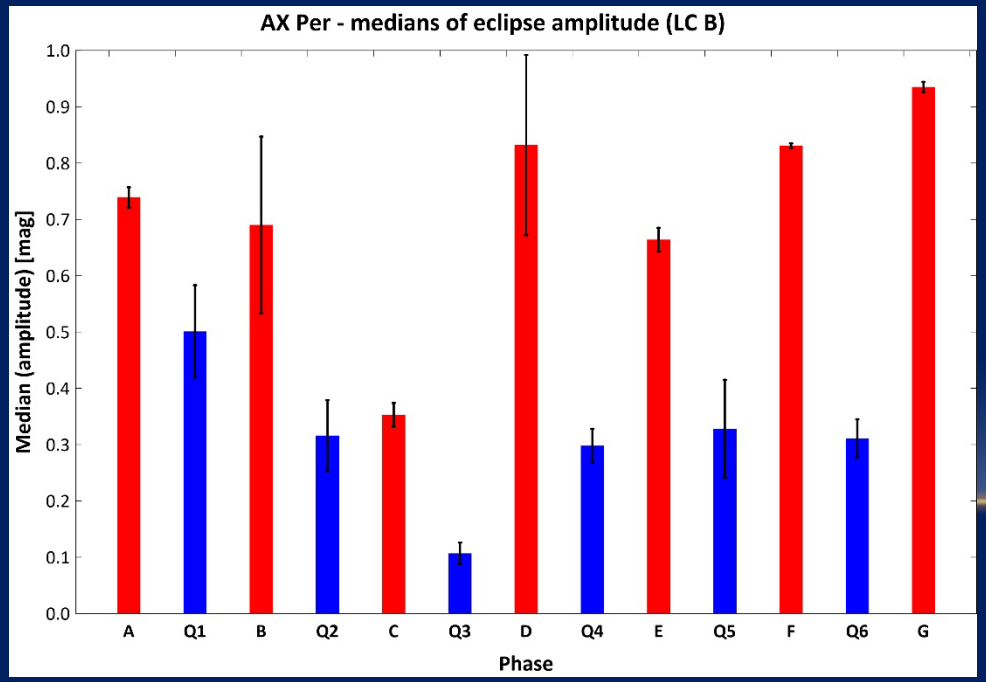


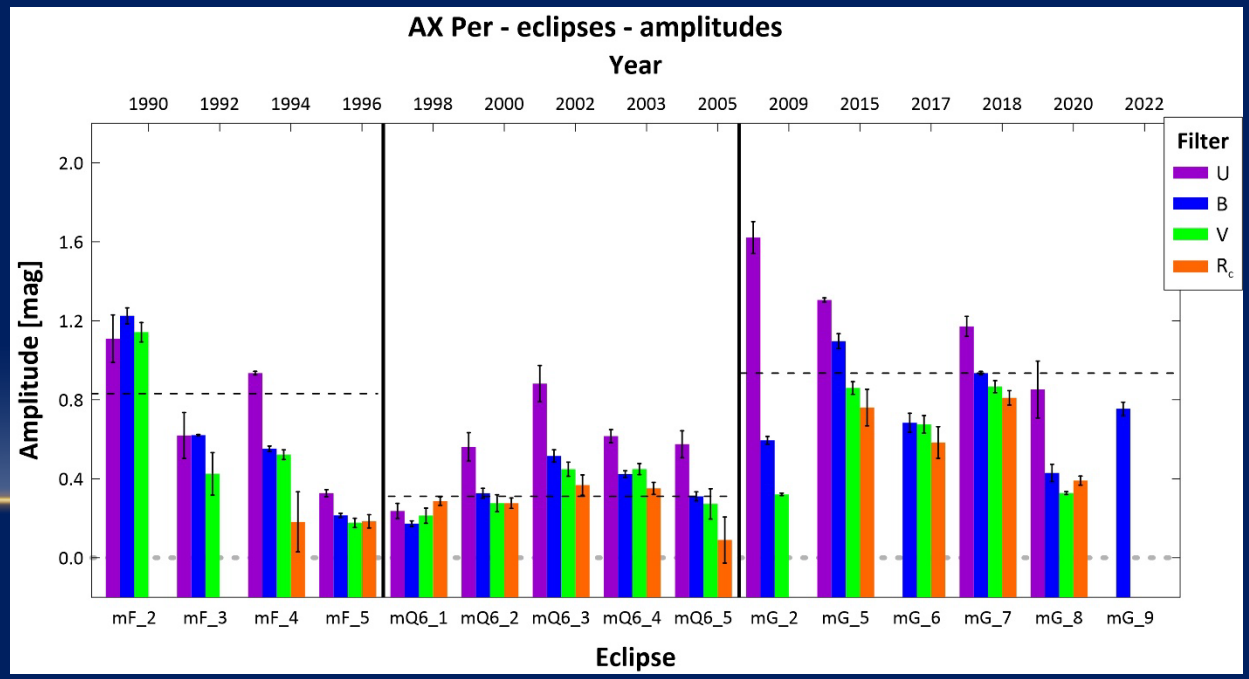




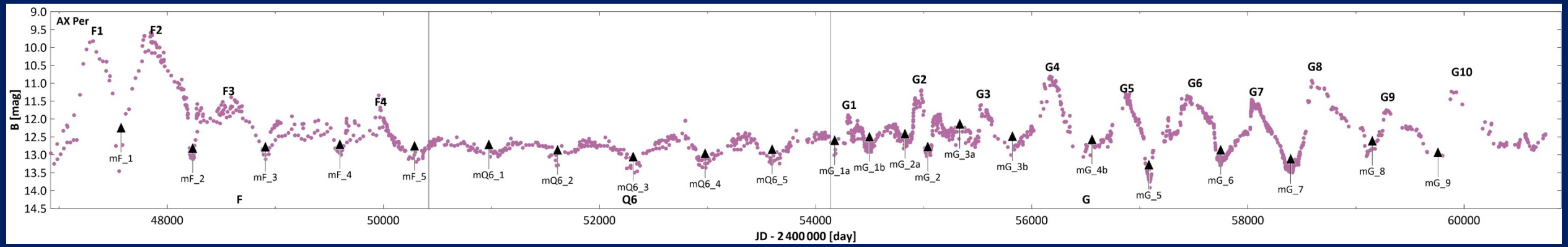
THE ECLIPSES - AMPLITUDES

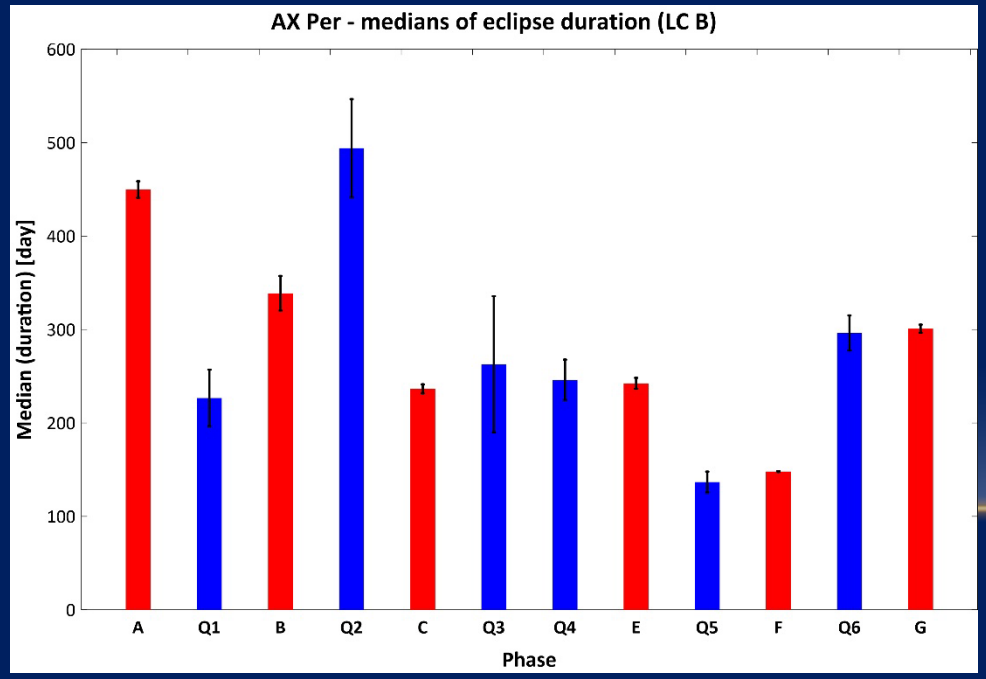


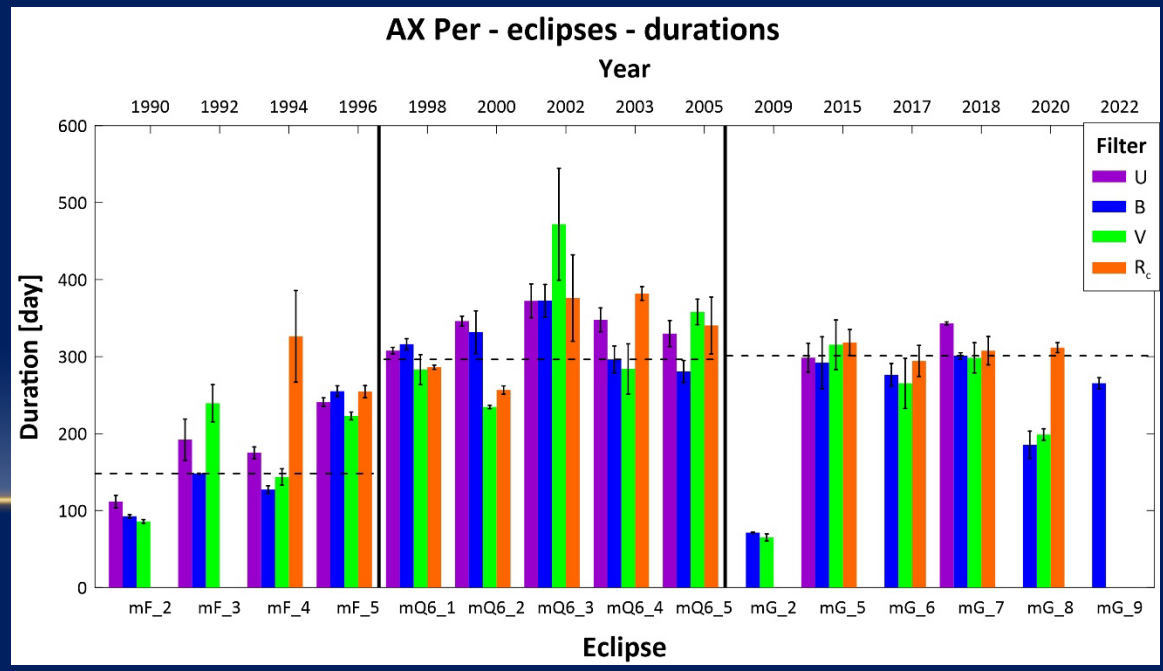




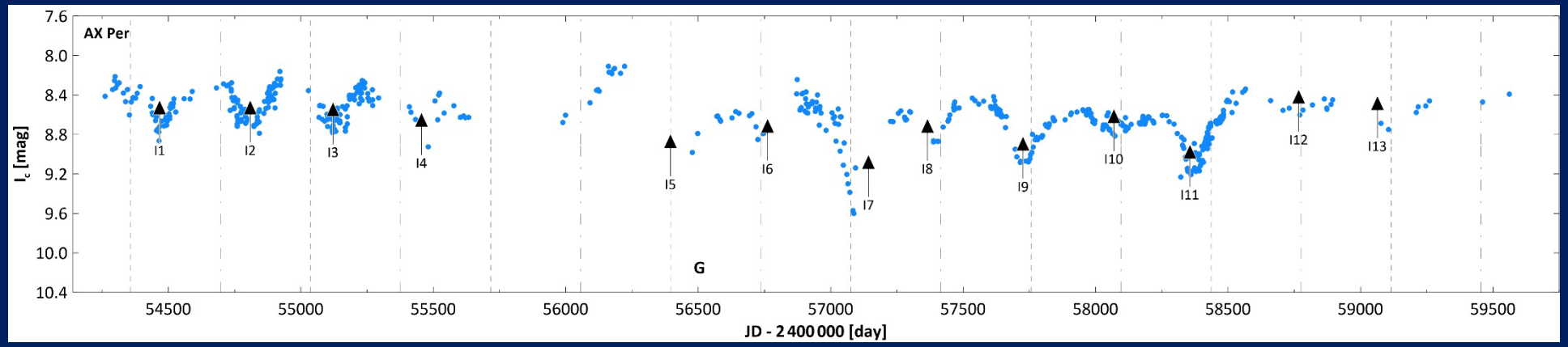
THE ECLIPSES - DURATIONS

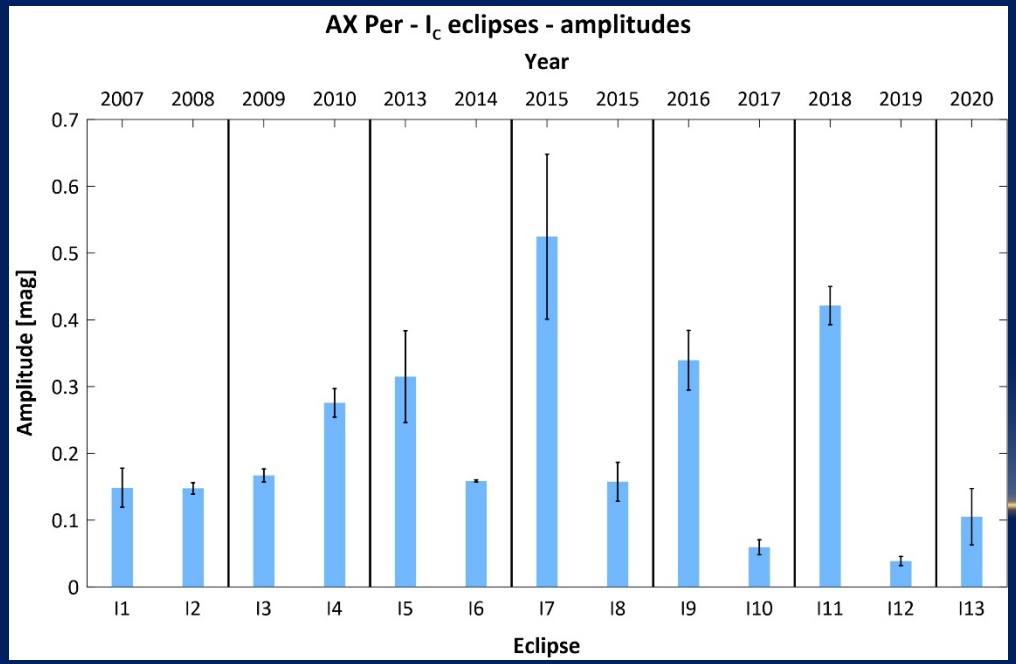


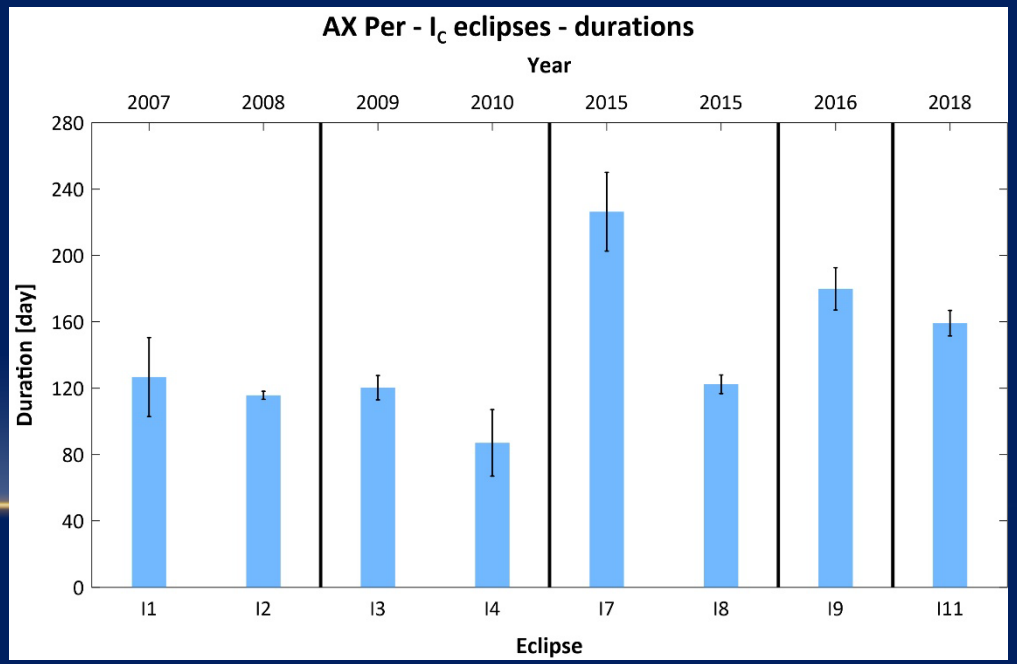




THE LIGHT CURVE IN THE FILTER I_C







CONCLUSION

- **The outbursts:** 5 major outbursts, phase **G** – lower amplitudes than in the past, highest prominence in the filter *U*, duration – independent of the used band.
- **The eclipses:** higher amplitude in the active phases, most prominent in the filter *U*, change of the duration after the phase **F**.
- **The curve in the filter I_c:** primary and secondary eclipses, different behaviour periods through the phase **G**.

REFERENCES

- Andrych, K. D., Andronov, I. L., & Chinarova, L. L. 2020, Journal of Physical Studies, 24, 1902
- Kloppenborg, B. K. 2025, Observations from the AAVSO International Database, https://www.aavso.org
- Mártonfi, P., Gális, R., Merc, J. 2021, OEJV, 220, 26

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