

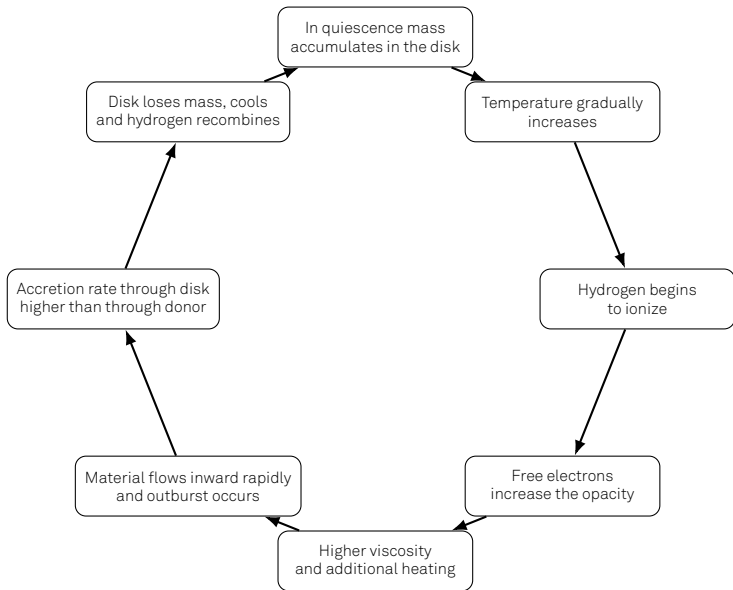
Observed sudden drop in disk brightness during quiescence in V627 Pegasi

Veera Vuolteenaho

Vitaly Neustroev

Nordic Baltic Astronomy Days, May 2026

Disk Instability Model (DIM)



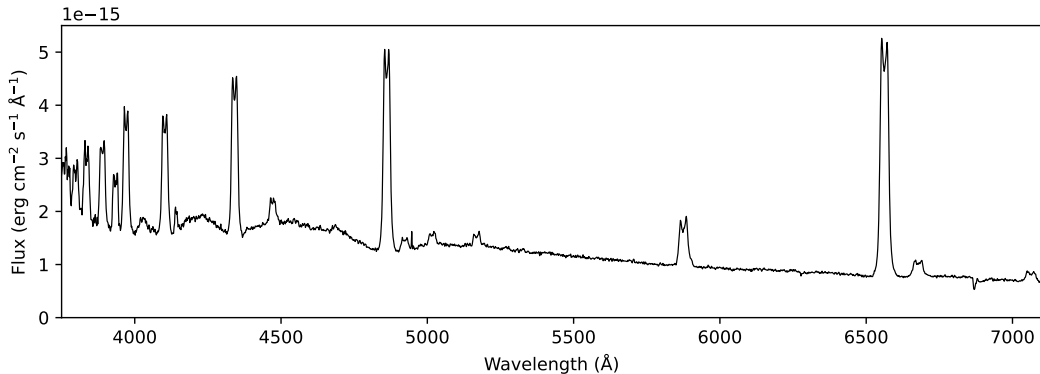
Limitations of DIM in WZ Sge-type systems

- Faint for decades, low accretion rates and optically thin discs
- Little evidence of gradual pre-outburst brightening
- No normal outbursts, unlike typical SU UMa systems
- Superoutbursts + superhumps require additional tidal effects (not in basic DIM)
- Rebrightenings not reproduced by standard DIM

V627 Pegasi

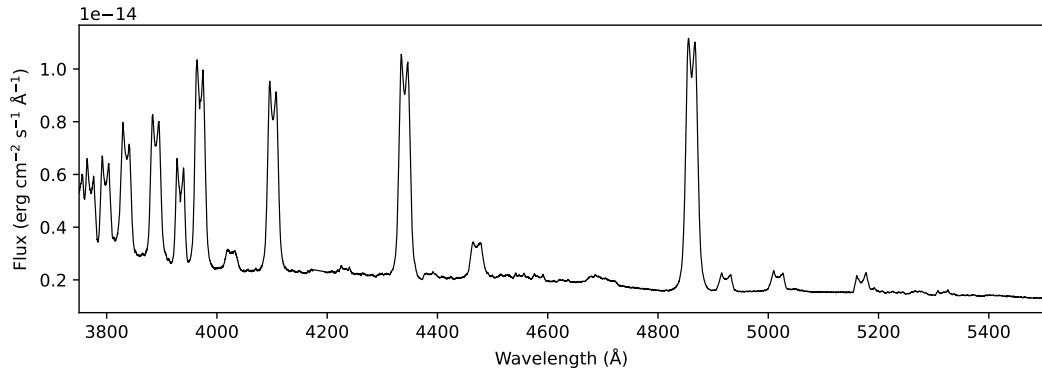
- WZ Sge-type
- Orbital period 78.2 minutes
- V mag \sim 16.1
- Outbursts in 1942, **2010**, 2014 and 2021
- Short orbital period - **good period bouncer candidate**
- Spectra from 2025, 2018, 2016 and 2014

NOT spectra from 2018 and 2025



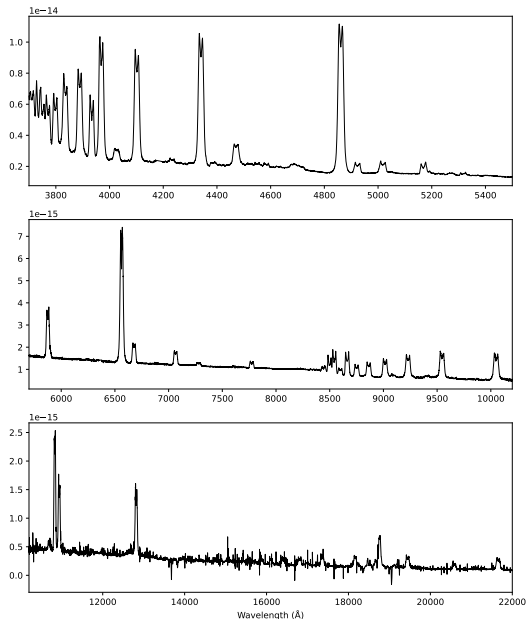
- Clear, strong hydrogen emission lines originating from the disk
- WD absorption lines

X-shooter spectra from 2014 and 2016

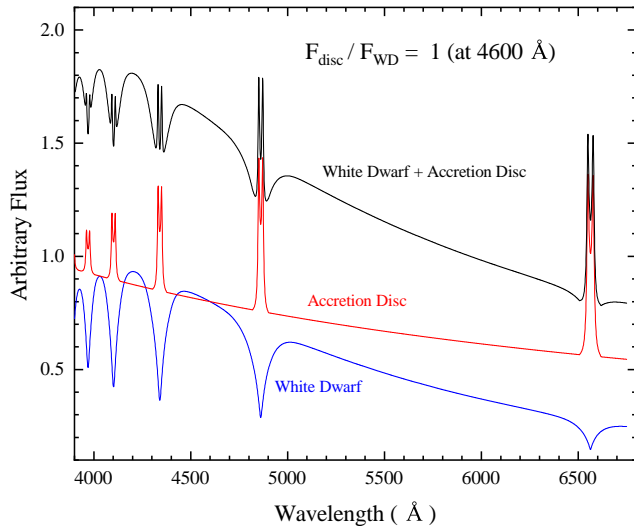


X-shooter spectra from 2014 and 2016

- Disk in a brighter state than in NOT data -> **WD**
absorption lines are not visible in either of the years
- 2014 data taken 2 days before an outburst, so still in quiescence

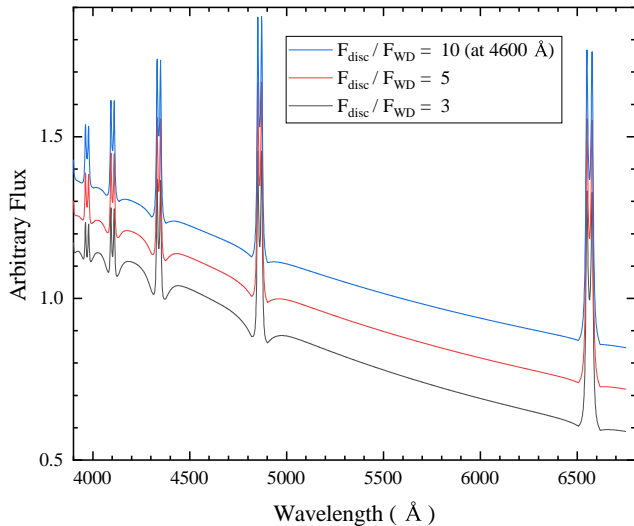


Spectrum modeling



Neustroev et al. (2025) *The accretion discs in WZ Sge-type stars in deep quiescence. How do they outburst?*

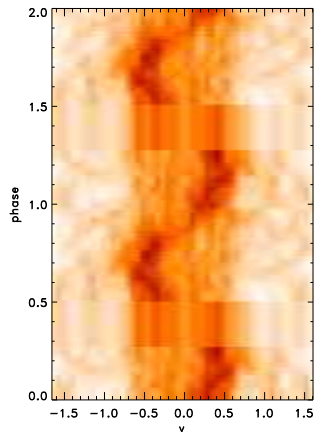
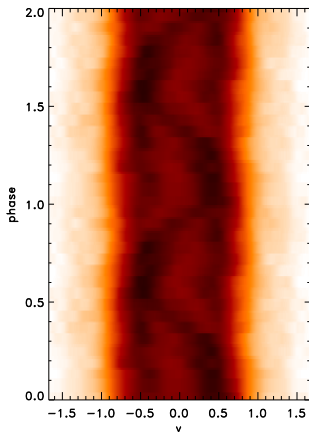
Spectrum modeling



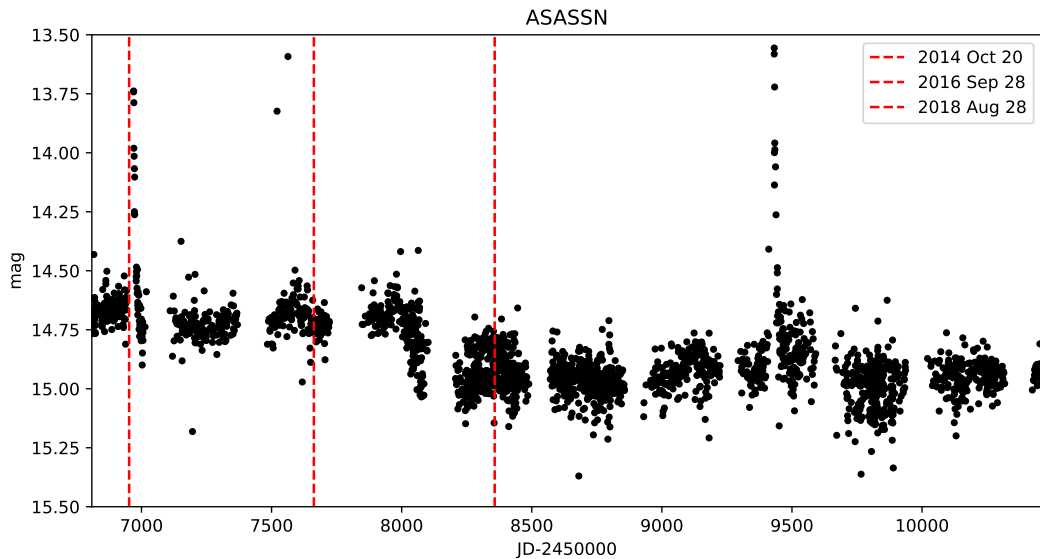
Neustroev et al. (2025) *The accretion discs in WZ Sge-type stars in deep quiescence. How do they outburst?*

Trailed spectra of He I 4471

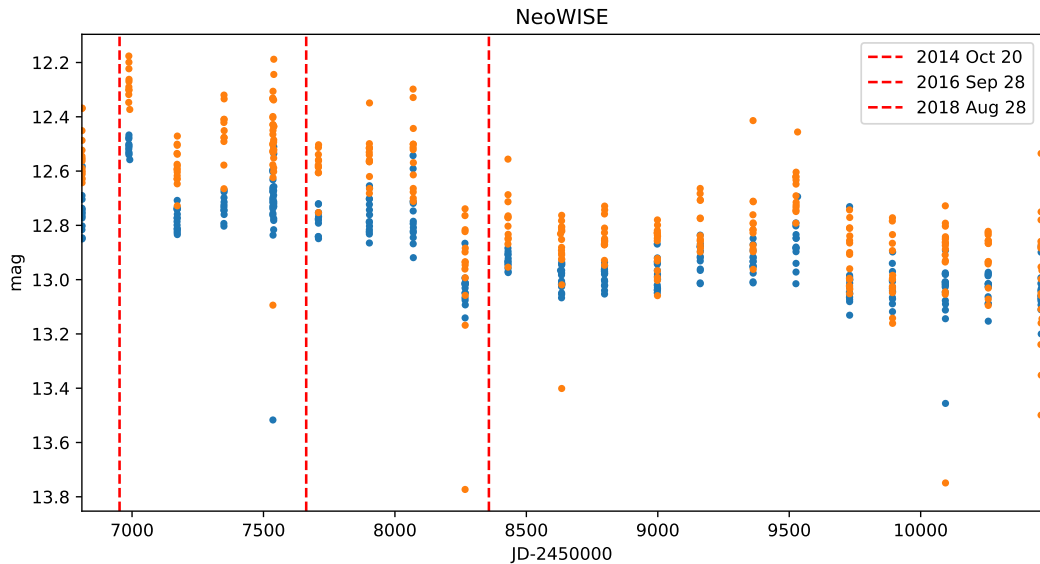
- Disk visible in 2016 but not in 2025
- In 2016 disk was hot enough to ionize helium



Light curves



Light curves



Light curve

- Very close companion star
- The detected drop much stronger in reality

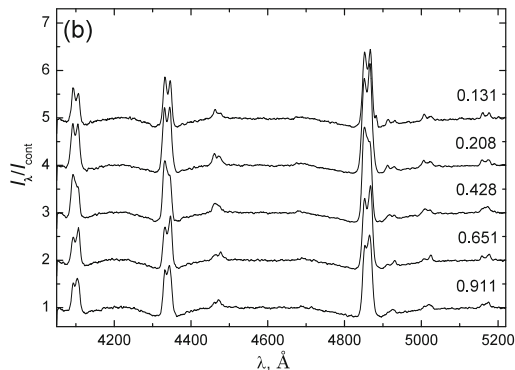
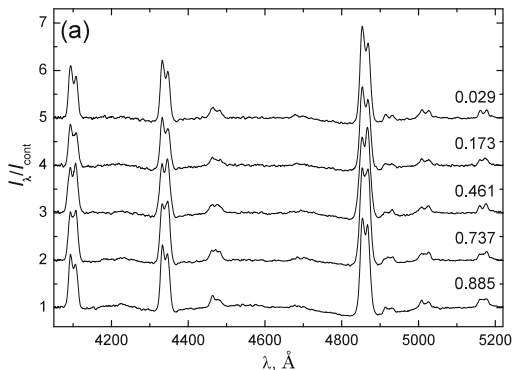


Discussion

- Sudden decrease in mass transfer rate → increase?
- Sudden increase has been theorized for WZ Sge types, but never observed
- Literature spectra shows that the WD lines have been visible before 2014

Literature spectra

- Mitrofanova, A. et al. (2014), *Analysis of cataclysmic variable GSC 02197–00886 evolution*



- Spectra (left) taken in 2010, 3 months after an outburst
- Spectra (right) taken in 2012, 2 years after an outburst

Discussion

- Increase must have happened between 2012 and 2014
- Not normal post-outburst behaviour for this system
- Much stronger long-term accretion-state variability than we usually assume
- Archtype WZ Sge appears remarkably stable between outbursts
- Important for understanding the long-term evolution of these systems as a whole
- It would be interesting to see if this kind of behaviour is present in other WZ Sge systems

Summary

- V627 Peg exhibits two distinct quiescent accretion states.
- In 2012, 2018, and 2025 the system shows the canonical WZ Sge-like deep-quiescent spectrum with visible WD absorption.
- 2014 and 2016 reveal a substantially brighter accretion disk that completely obscures the white dwarf signature
- Sudden mass transfer rate change

Thank you!