

4. Spectroscopic evolution (Fig.11)

- 20 optical spectra of AT 2025abao over ~ 3 months
→ canonical LRN

At early phases

- a blue continuum with narrow Balmer lines in emission

At peak phase

- the spectral continuum had cooled to a yellow color, with a $T_{BB} \sim 6000$ K. Balmer lines had weakened, while absorption lines from metals (Fe I, Fe II, Sc II, Ba II, Ti II) had developed, and they were particularly broad from the UV Ca II H&K lines.

At later phases

- an orange continuum ($T_{BB} \sim 4000 - 5000$ K), a return in strength of the Balmer lines and the formation of molecular absorption bands (TiO, VO).

Balmer line analysis

- narrow (~50 km/s) absorption and broad (~450 km/s) emission profiles in the Balmer lines at -3.4 days (Fig.12)
→ a slower wind and a faster outflow
- Counter P Cygni profile at +34 days (Fig.13)
→ as infalling material from a disc on the orbital plane towards the central system through the second Lagrangian point

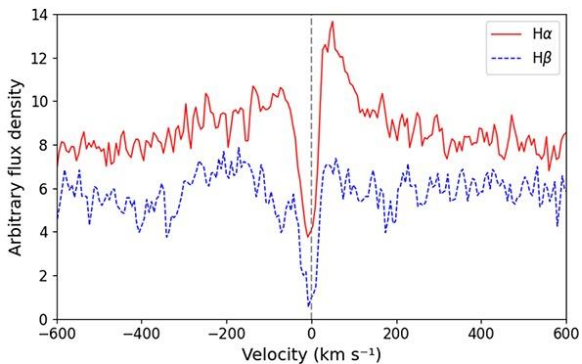


Fig.12 right; -3.4 days H α & H β profile

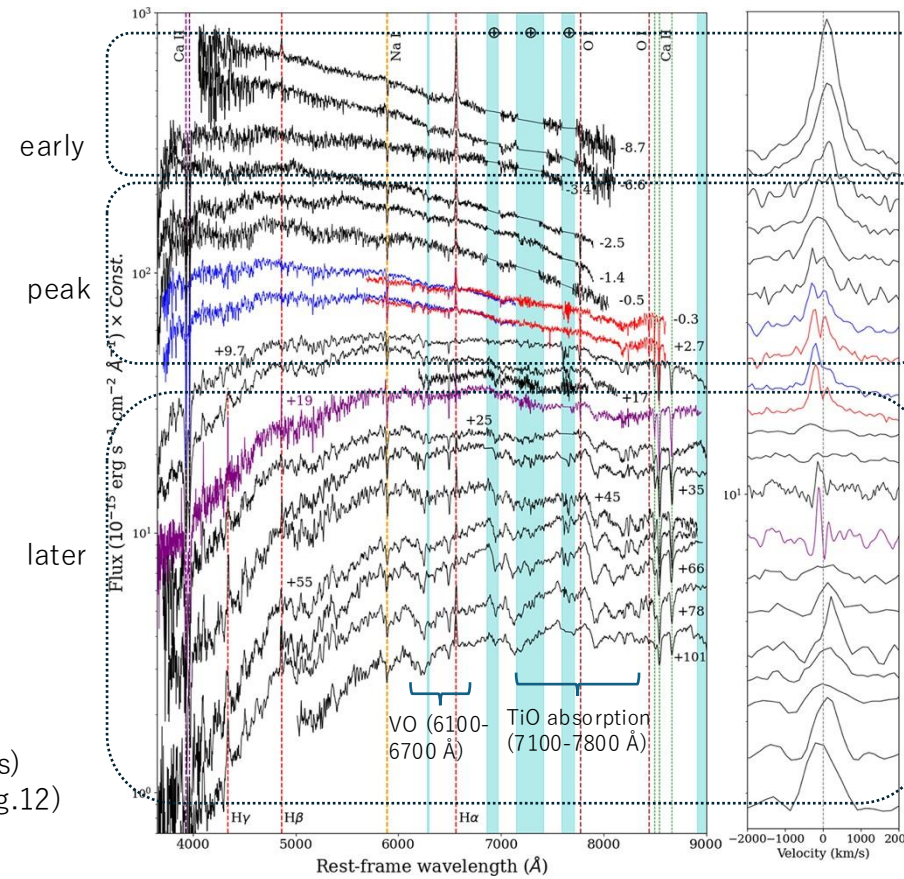


Fig.11 left; spectral time series right; evolution of H α profile

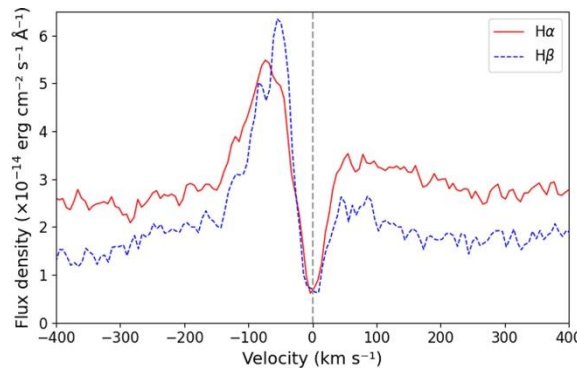


Fig.13; +34 days H α & H β profile

5. Discussion and Conclusion

- Their proposed scenario (Fig.17)
 1. The cores of the two stars collide, and the kinetic energy is transferred to the fast-moving outflow, ejected along the polar direction.
 2. Shock fronts can be produced when the outflow hits the common envelope.
 3. On the orbital plane, the system is surrounded by a disc or torus-shape structure, made of slow-moving material, some of which could also infall towards the system via the L2 point

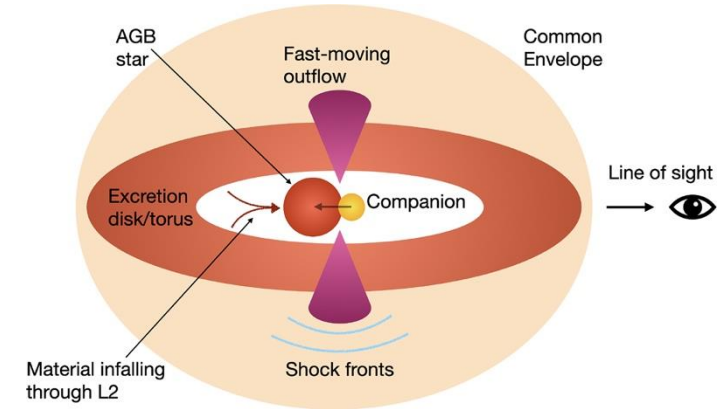


Fig.17; Schematic sketch presenting the proposed scenario

- AT 2025abao is an LRN that shows a **plateau-like light curve** instead of a double-peaked one.
 - Its early-AGB progenitor likely had an extended, **H-rich envelope**
 - the plateau can be explained by the recombination of a large amount of hydrogen ionized by shocks after the merger.

→ They propose that the dichotomy of light-curve behavior in LRNe (two peaks vs. plateau) can be **explained by the extent and H-richness of the common envelope.**