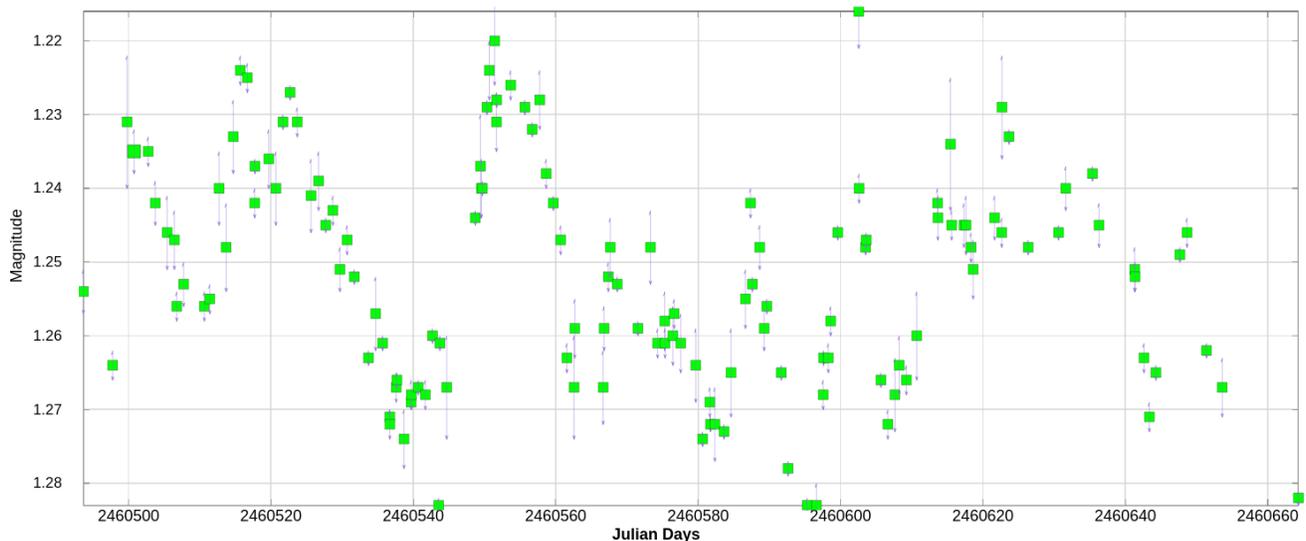


# PEP Campaign on $\alpha$ Cygni Variables

6 November 2025

At this time,  $\alpha$  Cygni stars are the most important targets for the PEP observing group. They are supergiants of spectral classes B and A that pulsate and change in brightness. Deneb is the prototype of this class, hence the name. These are evolved stars that have exhausted hydrogen in the core and have swollen to massive size. We see them as bluish or whitish in color. They may be in the process of becoming red supergiants, moving left to right across the Hertzsprung-Russell diagram, or they may be post-red-supergiants that have swung back to the left after shedding a cool exterior. We don't know which for certain. The pulsation type (radial, non-radial, or "strange") is open to debate, and it's unclear exactly how the photometric variation is linked with the pulsation. The stars show periods of moderately regular variations as well as episodes of erratic changes. All this makes  $\alpha$  Cygnis interesting research subjects.

So why PEP? First off, the range of photometric variation is less than 0.1 magnitude in V band. This calls for the precision that PEP can supply much more readily than CCD/CMOS systems. And as a group PEP observers exhibit much higher internal consistency leading to better combined light curves. Finally, there are many very bright examples of the  $\alpha$  Cygni class. The Variable Star Index lists at least twenty-one that are brighter than magnitude V=5 and at least six brighter than V=3 (Rigel is another target). This is where AAVSO PEP excels.



PEP light curve of Deneb, July-November 2024

Our challenge with these stars is to get dense coverage—one data point per night would be ideal. This calls for many observers with considerable geographic scatter (so as to avoid widespread clouds, smoke, etc.). The color variation of  $\alpha$  Cygnis is small, so we can work exclusively in V band and get good results. For the very brightest stars an equatorially mounted 8" Cassegrain or 5" short-focus refractor telescope will suffice. The one wrinkle is that observers need to be able to leave their telescopes set up for extended periods. Nightly set-up and tear-down will not be practical. We have a small supply of loaner photometers available for those who do not have them. They are easy to use and we can help with training.

**Come Join Us!**