

## Line Brightness Variations in Alpha Orionis - Phase Differences and Radial Velocities

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Observations of the red, bright supergiant star  $\alpha$  Orionis (Betelgeuse) during the past decade show significant variations in UV line fluxes and line shifts. Dupree *et al.* (1987) pointed out that the data from 1984-1987 indicates a periodicity of slightly more than one year in the B magnitude, UV continuum, and Mg II emission line fluxes. Our data shows that this conclusion applies to other strong and medium strong chromospheric lines as well. The variations seem to affect also the relative strength of lines within multiplets.

The UV line shift amplitudes are of the order 10-20 km/s and show the same general variability as the fluxes. Both fluxes and shifts show small phase differences from line to line. Moreover, there is a time lag of approximately 0.3 years in the chromospheric emission line fluxes relative to the photospheric radiation (B magnitude and UV continuum). These observations strongly suggest the existence of large scale velocity fields in the stellar atmosphere, possibly in the form of radially outwards propagating disturbances.

### Reference

Dupree, A.K., Baliunas, S.L., Guinan, E.F., Hartman, L., Nassiopoulos, G.E. and Sonneborn, G. 1987, *Ap. J.*, 317, L85-L89.