

ER Del: A True Symbiotic S Star?

Hollis R. Johnson
Indiana University

Thomas B. Ake
Space Telescope Sci. Inst./CSC

ER Del = BD+8:4506 is a faint ($m \approx 10$) irregularly variable PRG star classified spectral type S5.5/2.5 (Ake 1979). Spectra show H alpha in emission and a strong UV continuum with emission lines of C IV, Si III], and C III] -- characteristic of symbiotic-like stars. Although a few other MS and S stars have hot companions, this is the first to show hydrogen emission lines in the optical region. It has been suggested (Smith & Lambert 1986; Little *et al.* 1987) that all Tc-deficient PRG stars are accidental; that is, they arose by mass transfer when the currently degenerate companion was itself an AGB star. Indeed, the Tc-deficient S stars HR 1105 (Ake, Johnson and Peery 1988) and HD 35155 (Ake and Johnson 1988) and the R8 star HD 59643 (Johnson *et al.* 1988) not only have hot, subluminous companions, but also are interacting systems - a sign the components are close enough for mass transfer to have occurred. An accretion disk is probably present.

In ER Del, the hot component is also variable, and the continuous flux at 1350 A is 2.5 times that of the companion in the brightest of these systems, HD 35155. Luminosities in C IV are: for HR 1105, 8×10^{30} ; for HD 59643; 9×10^{30} ; for HD 35155, 2.4×10^{31} ; for ER Del, 1.5×10^{32} erg/s. Unlike these other stars, there is in ER Del no Mg II emission, and absorption features of Fe II are strong even at low dispersion. Thus the IUE flux is completely dominated by the secondary, whereas in the other systems the PRG is seen down to 2600 A. The H alpha emission is symmetric with a strong absorption core, and thus does not arise from a wind or stream from the primary; its presence in ER Del is no doubt due to the larger luminosity of the secondary. The brightness variability and range of excitation indicates we are observing stratified regions in a binary PRG + accretion disk system.

Ake, T.B. 1979, *Astrophys. J.*, **234**, 538.

Ake, T.B., Johnson, H.R. 1988, *Astrophys. J.*, submitted.

Ake, T.B., Johnson, H.R., Peery, B.F. 1988, *A Decade of UV Astronomy with the IUE Satellite*, ed. E.J. Rolfe, ESA SP-281, in press.

Johnson, H.R., Eaton, J.A., Querci, F.R., Querci, M., Baumert, J.H. 1988, *Astron. Astrophys.*, in press.

Little, S.J., Little-Marenin, I., Bauer, W. 1987, *Astron. J.* **94**, 981.

Smith, V.V. and Lambert, D.L. 1986, *Astrophys. J.*, **311**, 843.