Otero, S. 2008, http://ar.geocities.com/varsao/delta_Sco.htm
Otero, S., Fraser, B., & Lloyd, C.. 2001, IBVS 5026
Rivinius, Th., Baade, D., Štefl, S., & Maintz, M. 2001, A&A, 379, 257

4.11. He I 6678 Emission Activity in γ Cas

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I continue to monitor He I 6678 emission in γ Cas as described in BSN 38 (Pollmann & Stober 2007) and have now accumulated observations over six years. In this short paper I report on emission behavior from August 2005 to October 2008. I used the 0.4 m Schmidt-Cassegrain telescope at the observatory of the Vereinigung der Sternfreunde Köln. The slit spectrograph I used has a dispersion of 27 Å mm^{-1} (0.245 Å pixel^{-1}) with $R = 14,000$. Exposure times ranged from 30 to 40 s. I combined individual raw spectra with $60 <$ S/N < 80 to achieve high S/N in summed spectra. In case of any cosmic ray appearence the respective spectrum has been rejected not to introduce artificial flaws within the nightly sum spectrum. The complete data reduction and equivalent width measurements have been done according to a standard procedure as already described in Pollmann (1997). The accuracy of an EW measurement was determined in each sum spectrum according to the method of Chalabaev & Maillard (1983). The size of the error bars of individual data points correspond to the maximum standard deviation of 6% in EW of He I 6678 and 2% in EW of Hα. The S/N ratio was always between 400 and 1000.

Figure 1 identifies an episode of unusually strong emission in the red and blue wings of the He I 6678 absorption profile. This plot compares the average profile for the period November 2007 to August 2008 with individual observations during this event on 18, 21, and 26 September 2008. Figure 2 presents observed equivalent width for January 2003 through September 2008. Here, with two exceptions, the equivalent width is a sum of emission peaks at 6675 Å and 6680 Å. For JD 2454728 and 2454731, or 18 and 21 September 2008, respectively, the equivalent width is a sum of emission in the wavelength range 6658 Å to 6695 Å to be consistent with the emission line profile on these dates in Figure 1.

This sort of sudden activity has been observed by others. In γ Cas, a "flare" with a duration of several minutes, appearing as additional emission at 6680 Å in the He I 6678 peak, was observed by Smith (1995). Rivinius et al. (2001) found additional emission in He I 6678 at 6675 Å and 6680 Å during an outburst of μ Cen. They concluded that "...there can be little doubt that the bump patterns we described ..." are related to variations reported by investigations of numerous optical wavelength lines of γ Cas. Doazan (1976) and Hutchings (1976) first reported variations in Hβ and Slettebak & Snow (1978) found similar but rapid variations in Hα. These authors believed the variations to be associated with the emission components of the line arising from erratic activity in the circumstellar disk.

So-called migrating subfeatures, so far known, are almost certainly caused by absorptions from clouds locked into corotation by magnetic fields from the star are seen irregularly on most nights of intensive observations. The prototypical example is the magnetic active dKe star AB Dor. These features have been seen by several observers in the optical beginning with Yang et al. (1998) and in the UV by Smith et al. (1998).

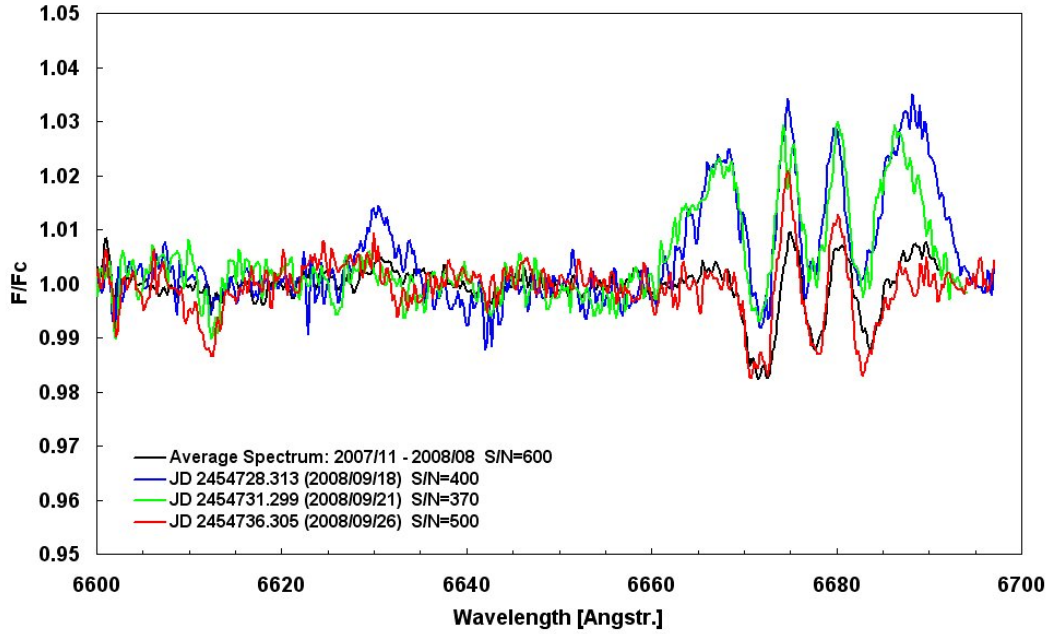

Figure 1. Comparison of an average He I 6678 spectrum (2007/11 to 2008/08) to the He I 6678 "event-spectra" on 2008/09/18 and 2008/09/21.

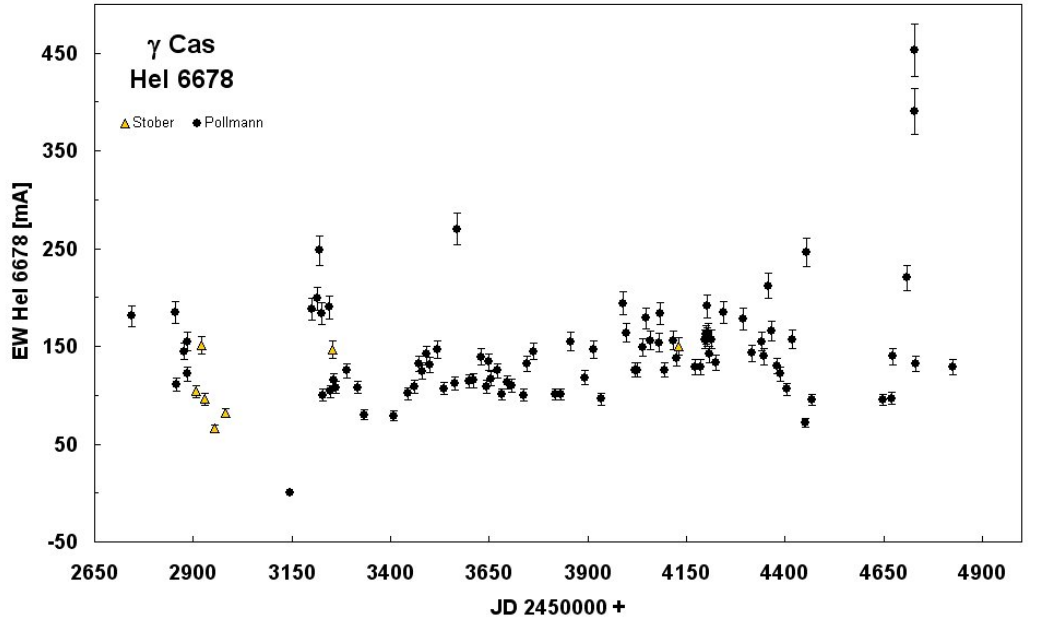

Figure 2. Monitoring of the time behavior of the He I 6678 emission from JD 24542744 to JD 2454826.

The outbursts reported herein are spectacular, particularly strong, and rare and it is likely that the small scale events have been formed near the star underlying the strong emission region (something similar was reported by Hutchings). The timescale of the observations JD 2454728.313 to JD 2454732.299 (71.7 hr) is comparable to the orbital time of the inner region of the disk. It is possible (probably likely) that matter has been ejected into an unstable orbit close to the star's surface. Smith (1995) also reported on similar variations.

In case it may be relevant to this situation, Figure 3 is a lengthy history of changes in Hα equivalent width as observed by myself and others. The arrow in the lower plot in Figure 3 marks the time when the He I 6778 event occurred. Further it should be mentioned, since the He EW is monitored, no correlation or response is found to the EW of Hα (see Fig. 4). Note that the strength of Hα in γ Cas has been steadily increasing since the last minimum at approximately JD 2454230.

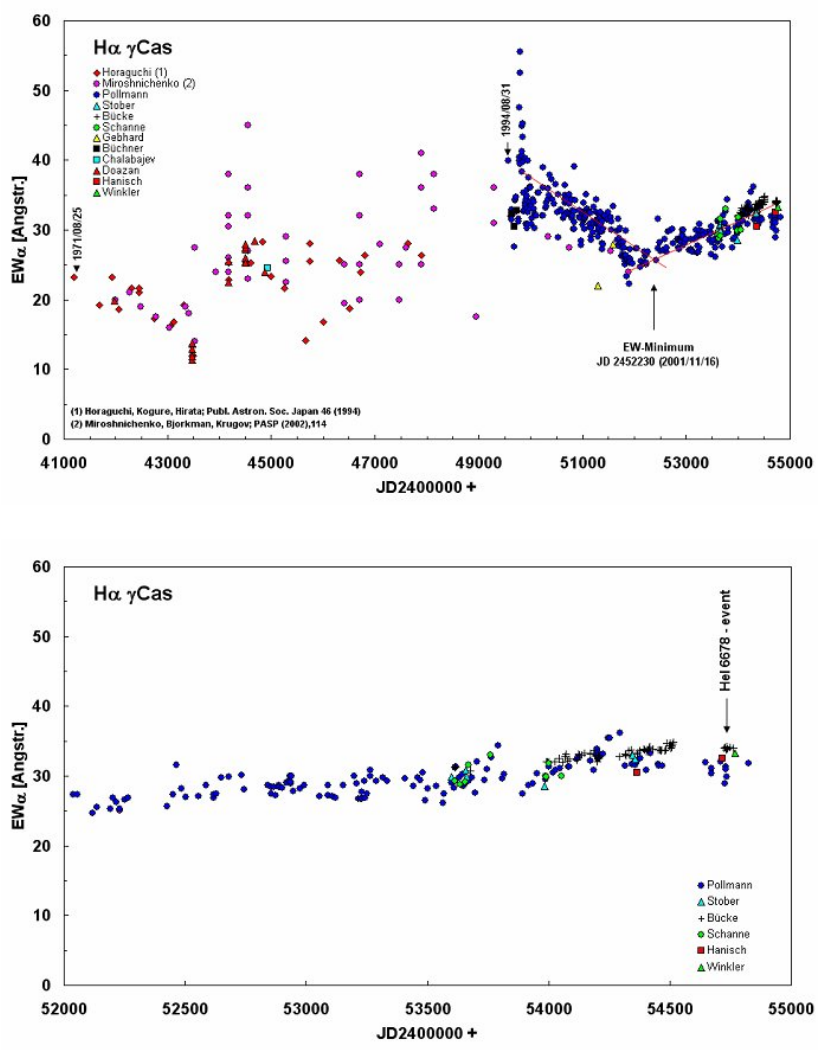

Figure 3. Monitoring of the time behavior of the Hα emission with the marked position of the He I 6678 "event-spectra."

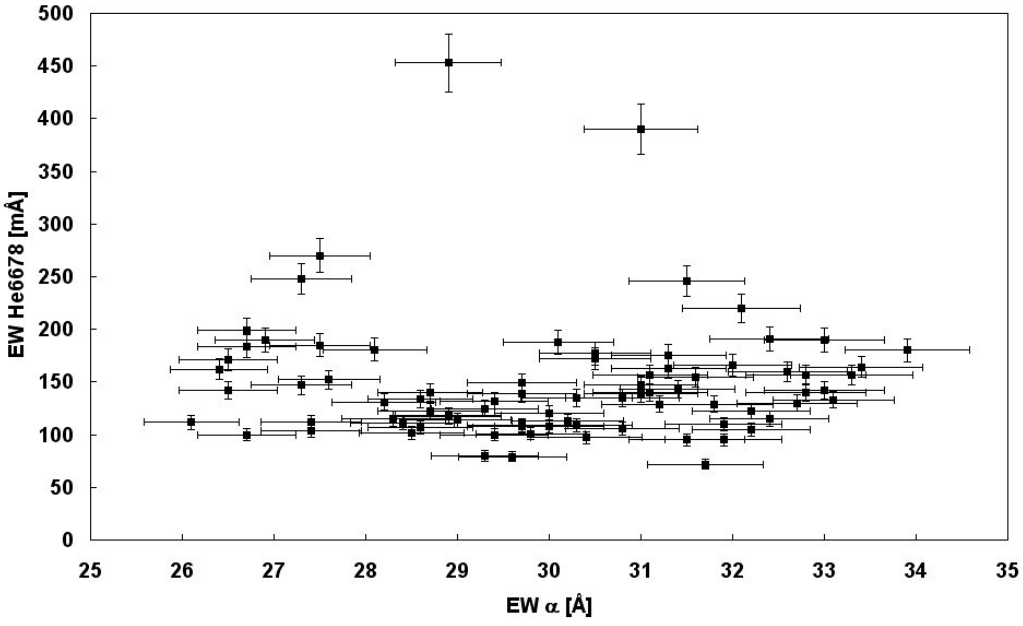

Figure 4. Plot as evidence that there is no correlation between the strength of the Hα and the He I 6678 emission.

References

Chalabaev, A., & Maillard J. P. 1983, A&A, 127, 279
Doazan, V. 1976, IAU Symposium No. 70, ed. A. Slettebak (Dordrecht: Reidel), 37
Hutchings, J. B. 1976, PASP, 88, 911
Pollmann, E. 1997, Be Star Newsletter, 32, 11
Pollmann, E., & Stober, B. 2007, Be Star Newsletter, 38, 8
Rivinius et al. 2001, The Journal of Astronomical Data 7, 5
Slettebak, A., & Snow, T. P. 1978, ApJ, 224, L127
Smith, M. A. 1995, ApJ, 442, 812
Smith, M. A., Robinson, R. D., & Hatzes, A. P. 1998, ApJ, 507, 945
Yang, S., Ninkov, Z., & Walker, G. A. H. 1988, PASP, 100, 233

4.12. Czech Astronomer Jiří Krpata Has Passed Away

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Czech astronomer Jiří Krpata, a kind and modest person, died suddenly on February 6, 2009. All 20 published papers which he co-authored between 1971 and 2006 are devoted to Be stars and especially to the discoveries and follow up studies of binaries among them.

Jiří Krpata was born on April 10, 1941. He specialized in nuclear physics in secondary school and then studied at the faculty of Mathematics and Physics of the Charles University where