Continuation of the international observing campaign "Photometry and Spectroscopy of P Cygni

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The results of the ongoing international observing campaign „Photometry and Spectroscopy of P Cygni" [Pollmann & Bauer (2012) and Pollmann & Vollmann (2013)] have been supplemented further with spectroscopic and photometric data from an observing campaign during the July 2014 spectroscopic workshop (JD 2456865-2456870) at the observatory Haute Provence (OHP) in France. The spectroscopic observations were performed with several different spectrographs (ALPY, LISA, LHIRES III) as well as with the high resolution OHP spectrograph SOPHIE, (R = 45000). The Hα equivalent width (EW) of the OHP observations were inserted into a campaign, which had been started in July 2013 (Fig. 1). Fig. 1 shows that the OHP EW´s are in conformity with the current "ultra-short-term" EW changes, and emphasizes an increasing EW change frequency from July 2013 until now.

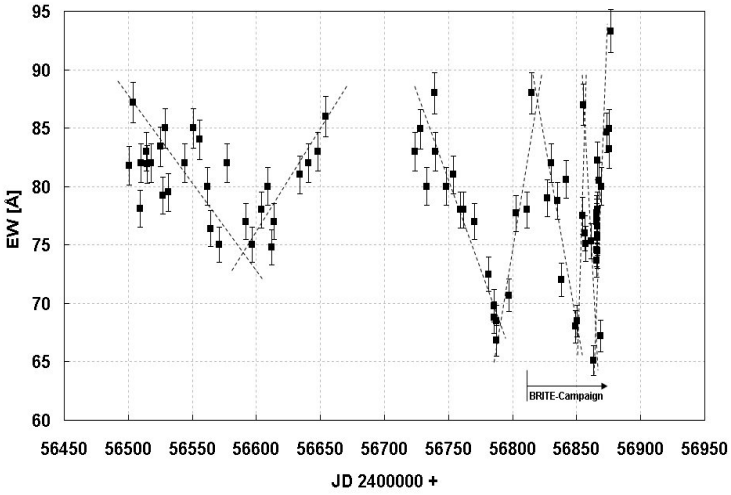

Fig. 1: 2013/14-EW-monitoring with increasing frequency of the EW variability

The photometric OHP Vmag measurements by J. Guarro (CCD & Johnson V-filter), and Vmag values of the AAVSO data base, along with the contemporaneous EW´s, led to the continuum-corrected, quasi-intrinsic Hα line flux [Pollmann & Bauer (2012) and Pollmann & Vollmann (2013)], which supplement the results of the „Photometry and Spectroscopy of P Cygni" campaign since 2005. The thesis of the independence of the quasi-intrinsic Hα line flux from the varying continuum brightness (Vmag) is illustrated in Fig. 2 (all data since 2005 until now). From a statistical point of view one can say that the low coefficient of 0.27 (which should be zero after the continuum correction), with consideration of the measurement uncertainties, suggests the conclusion that the Hα line flux is independent of V magnitude.

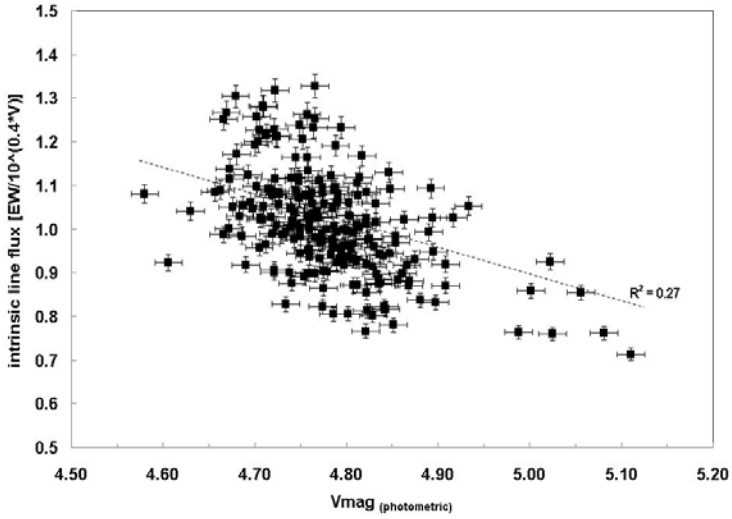

Fig. 2: The quasi-intrinsic Hα line flux versus photometric V brightness since 2005

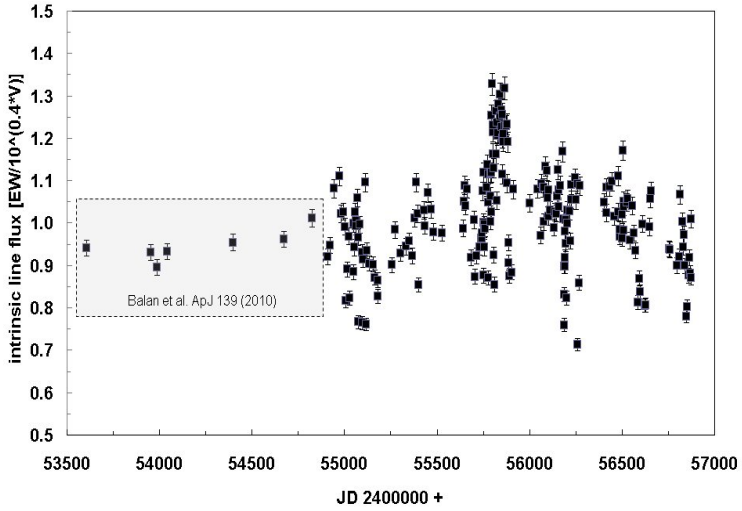

Fig. 3: Time behavior of the quasi-intrinsic Hα line flux since 2005

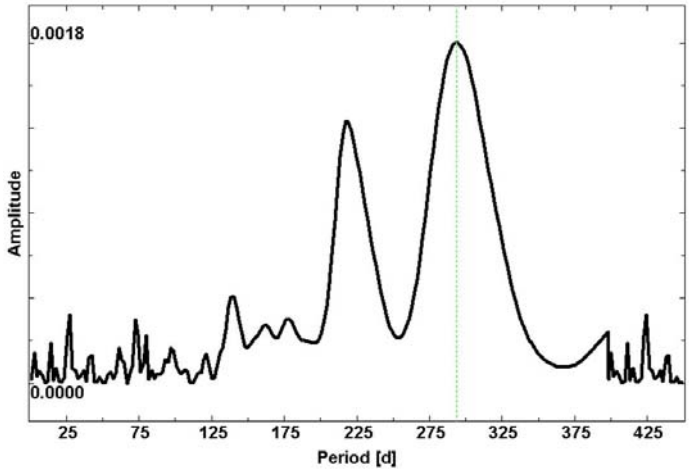

Fig. 4: Scargle periodogram of all data of Fig. 3

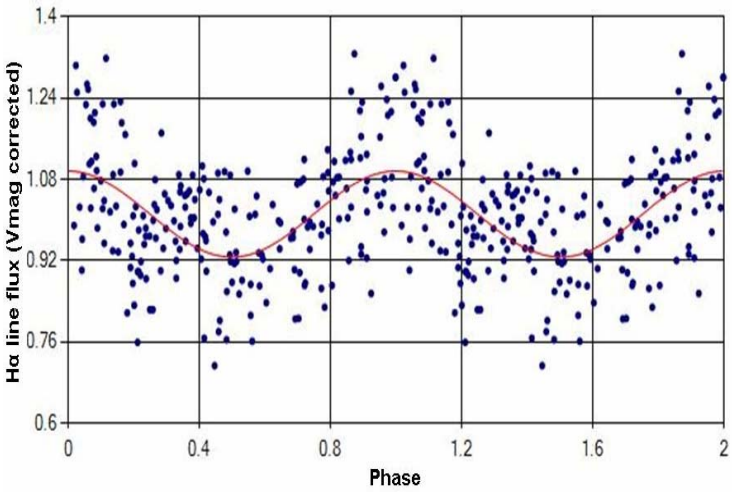

Fig. 5: Phase diagram of the analysis in Fig. 4

All data since 2005 from the partial monitorings, campaign 2013/14, and AAVSO-BAV-ASPA long-term montoring [Pollmann & Bauer (2012) and Pollmann & Vollmann (2013)] - have been used for calculation of the quasi-intrinsic Hα line flux (Fig. 3), as well as for a corresponding period analysis. The application of the period search program AVE led to a dominant period at 294 days (± 2.8 days) in the Scargle periodogram (Fig. 4). The new data set of EW and Vmag obviously seems to have revealed with more clarity the 294 day period. This is illustrated in the phase plot of Fig. 5, and shows once again that the cause lies within the stellar wind. Maybe the satellite-based BRITE campaign (Richardson 2014) is able to solve this mystery. Our continued investigation maybe will show, whether this period remains stable. Perhaps we can report here about the results after several years.

The following observers of the ARAS group contributed to this campaign report with their spectra:

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References

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