

## SDSS J1240–01: A NEW AM CVn CANDIDATE FROM THE SLOAN DIGITAL SKY SURVEY

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**A better understanding of the AM CVn population is crucial to constrain their candidacy as SN Ia progenitors, to test binary evolution (in particular the common-envelope phase), and to predict their observable gravitational radiation signature. An AM CVn-dedicated search in the Sloan Digital Sky Survey-DR1 resulted in the discovery of SDSS J124058.03–015919.2, a new AM CVn candidate previously identified as a DB white dwarf in the 2dF quasar survey.**

Both the SDSS and 2dF spectra show double-peaked helium emission lines and absence of any such hydrogen lines, indicating a helium-dominated accretion disk. They further show broad absorption features in the blue, which resulted in its DB white dwarf classification. The continuum can be fitted well with a 17,000 K blackbody. The system appears to be quite old and reminds of GP Com and CE 315 (low mass transfer; optically thin disk) but its still quite hot white dwarf primary, possibly re-heated by recent high mass transfer, indicates a much younger system.

Our first optical follow-up (taken 13-12-2003 with Magellan-I, spectral resolution 3 Å) clearly shows the double-peaked He I emission lines as well as He II  $\lambda 4686$  and N III  $\lambda 4634+4640$ . This combination suggests either a Bowen fluorescence mechanism at work (cf. Casares et al. 2003) or an extreme nitrogen abundance in the system (cf. Gänsicke et al. 2003). He II  $\lambda 4686$  is observed in most AM CVns, although in SDSS J1240 it is unusually strong compared to He I  $\lambda 4713$  (equivalent widths  $-4.0$  Å and  $-4.4$  Å respectively,  $\pm 10\%$ ). No traces of N III  $\lambda 4634+4640$  are found in high-quality spectra of GP Com and CE 315, while in the new system it is remarkably strong at an equivalent width of  $-2.4$  Å, more than half that of the He I  $\lambda 4713$  line. The FWHM of these lines is only a quarter that of the helium lines ( $\sim 5$  Å versus  $\sim 20$  Å), which suggests a non-disk origin. The strongest helium line at 5875 Å has an equivalent width of  $-31$  Å compared to  $-78$  Å in GP Com,

which can be explained nicely with an equally luminous, optically thin disk contributing little to the continuum, plus a primary that is more luminous by the factor expected from its higher temperature (17,000 K versus 11,000 K for GP Com, Marsh et al. 1991).

The AM CVn nature of the new system has yet to be proved beyond doubt with spectroscopic follow-up giving its orbital period, which we expect to be between 30–40 minutes. This places it between the cooler, shortest-period emission-line system GP Com and the longest-period systems among the outbursting AM CVns.

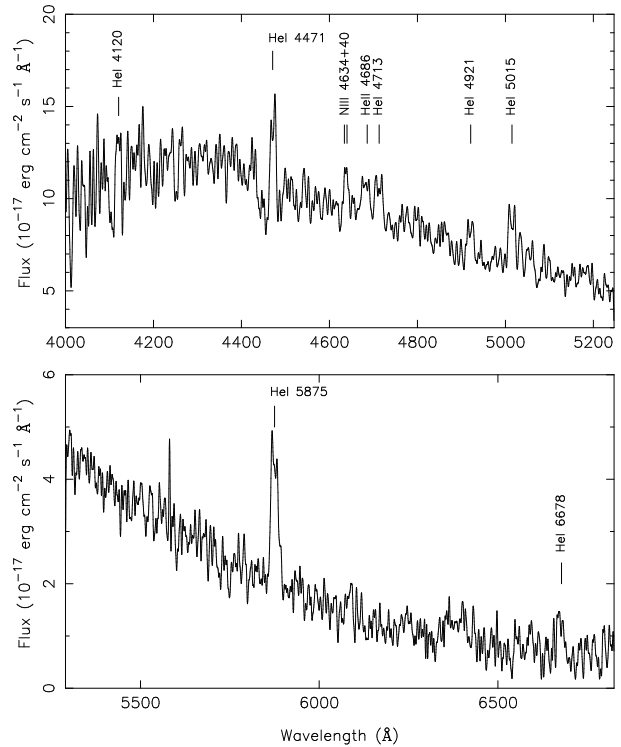


Fig. 1. The new AM CVn candidate SDSS J1240–01, observed 13-12-2003 with IMACS at Magellan-I.

### REFERENCES

- Casares, J. et al. 2003, ApJ, 590, 1041  
 Gänsicke, B. et al. 2003, ApJ, 594, 443  
 Marsh, T. R., Horne, K., Rosen, S. 1991, ApJ, 366, 535

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