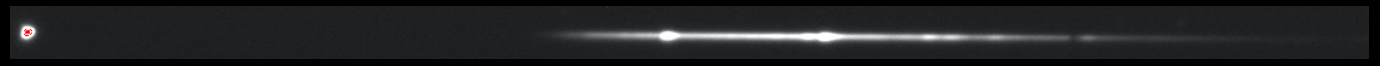
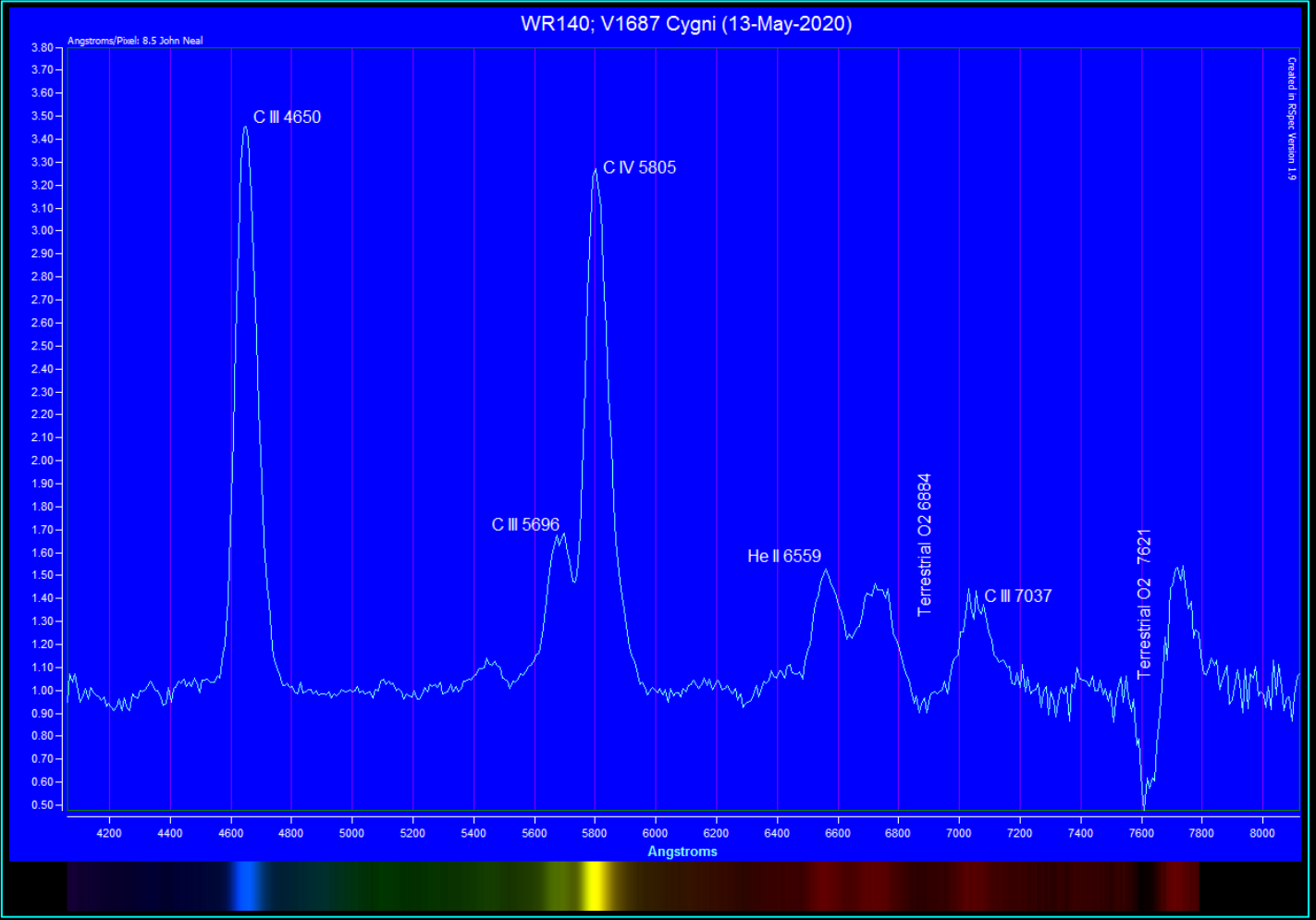
Low resolution spectroscopy of WR140, V1687 Cygni (HD193793)

Spectral image



Imaged with Celestron EdgeHD 8 / Atik 414EXM



Object notes:

WR140 is a binary system in Cygnus consisting of a 35.9$M_\odot$ O4-5iii type primary and a 14.9$M_\odot$ Wolf-Rayet companion.

The WR component is nearing the end of its life, has consumed or lost most of its hydrogen and is now fusing helium into heavier elements. The emission lines characteristic of WR stars are generated not directly by the Helium burning process in the star itself but rather by the dense high-velocity stellar wind region around the star which is expelling huge amounts of material from the star.

In the case of WR140, its O type companion also has a strong stellar wind and when these stars come into close proximity their colliding stellar winds generate huge quantities of radio and X-ray emission. The compression of their colliding stellar winds generates huge amounts of dust. This often leads to the creation a pinwheel nebula. WR140 is the archetype for colliding-wind binaries.

Spectrum notes:

The most notable feature of the W-R stars is their lack of absorption lines. Only the terrestrial absorption of atmospheric O_2 is visible here and, instead, we see prominent emission lines.

Although less massive and less luminous than the primary, the W-R component dominates the combined spectrum with its strong C III and C IV emission lines. WR140 is characteristic of the Carbon type W-R stars and its spectral classification is WC7.

There is also significant Helium emission (He II at 6559Å) and in this case it completely masks any Hα line in that part of the spectrum.