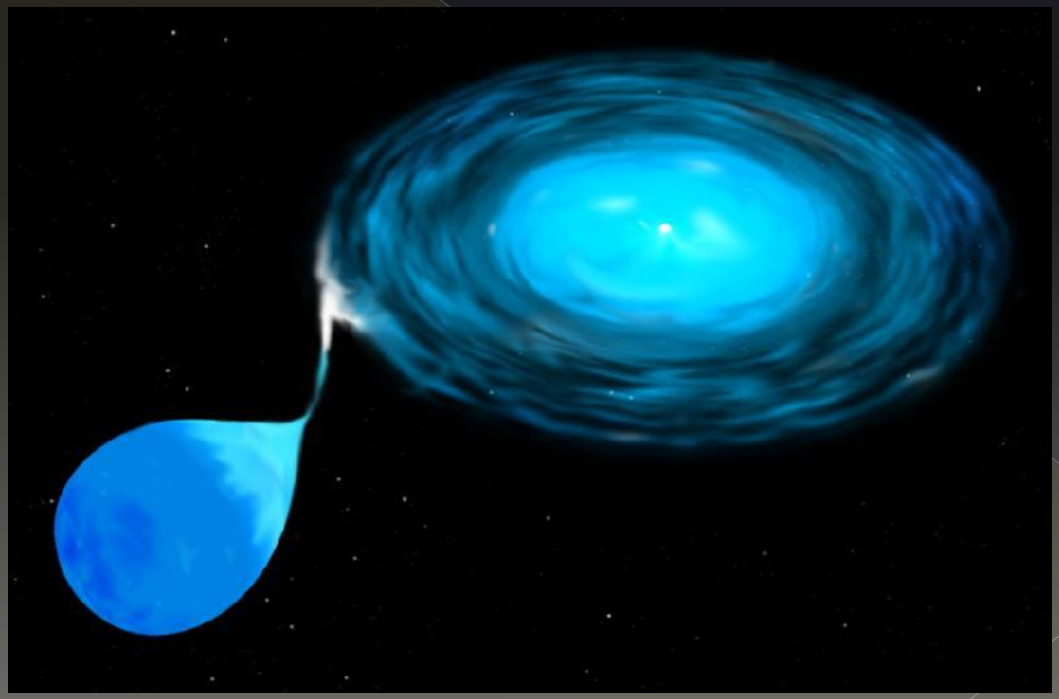
Am CVn binaria

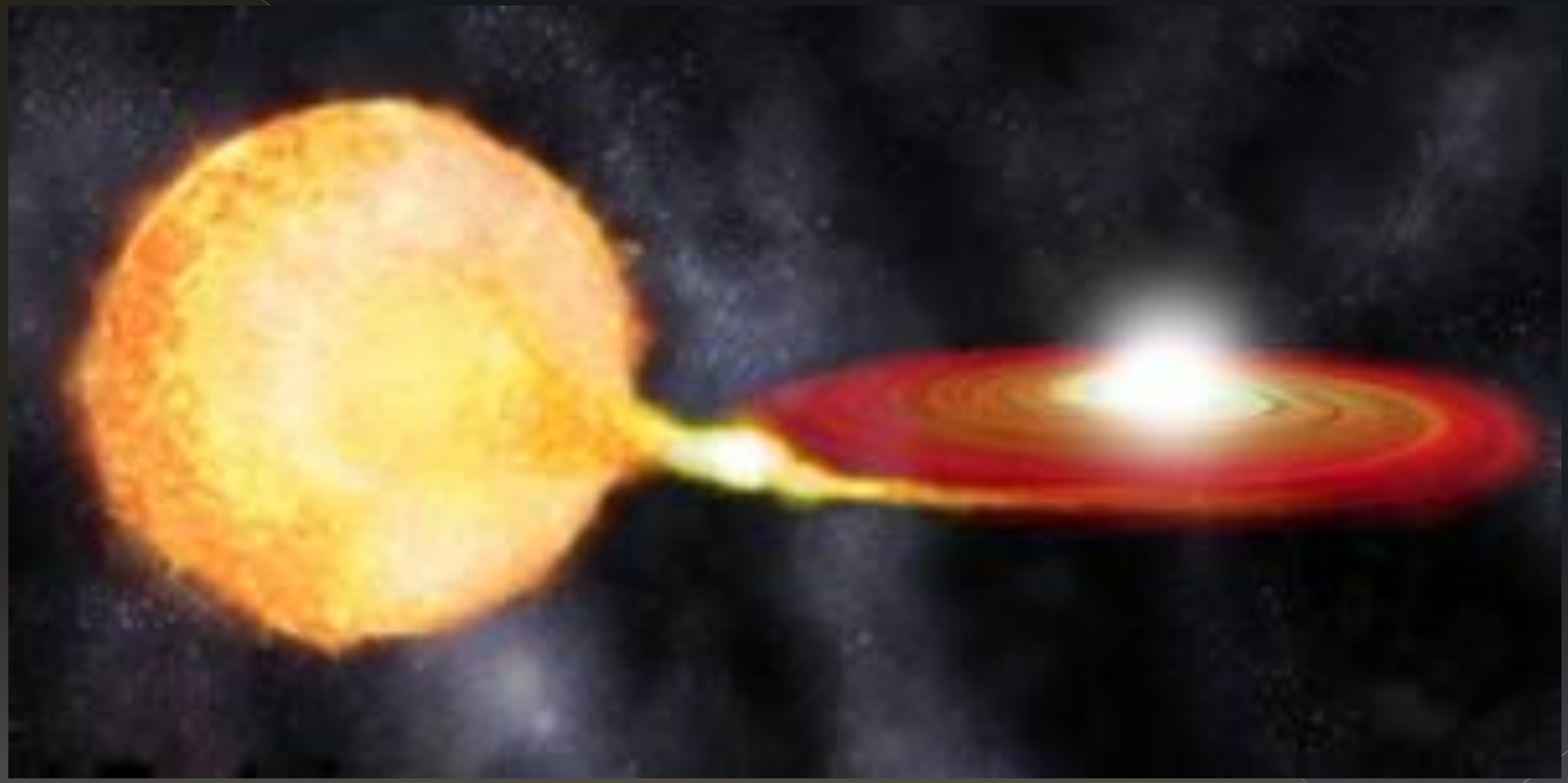
Estrellas variables AM Canum Venaticorum

SDSS J173047.59+554518.5



Características

- Enanas blancas binarias.
- Periodos orbitales muy cortos (5-65 mins).
- Transfieren masa, acreción de helio.
- Deficiencia de hidrógeno.
- Posible progenitora de supernova tipo Ia.



Espectrografía

- Observación del Gemini (Hawai), GMOS.

1. 3700 – 7100 ˚
2. Resolución 5.46 ˚A
3. Espectro visible, infrarrojo y ultravioleta.

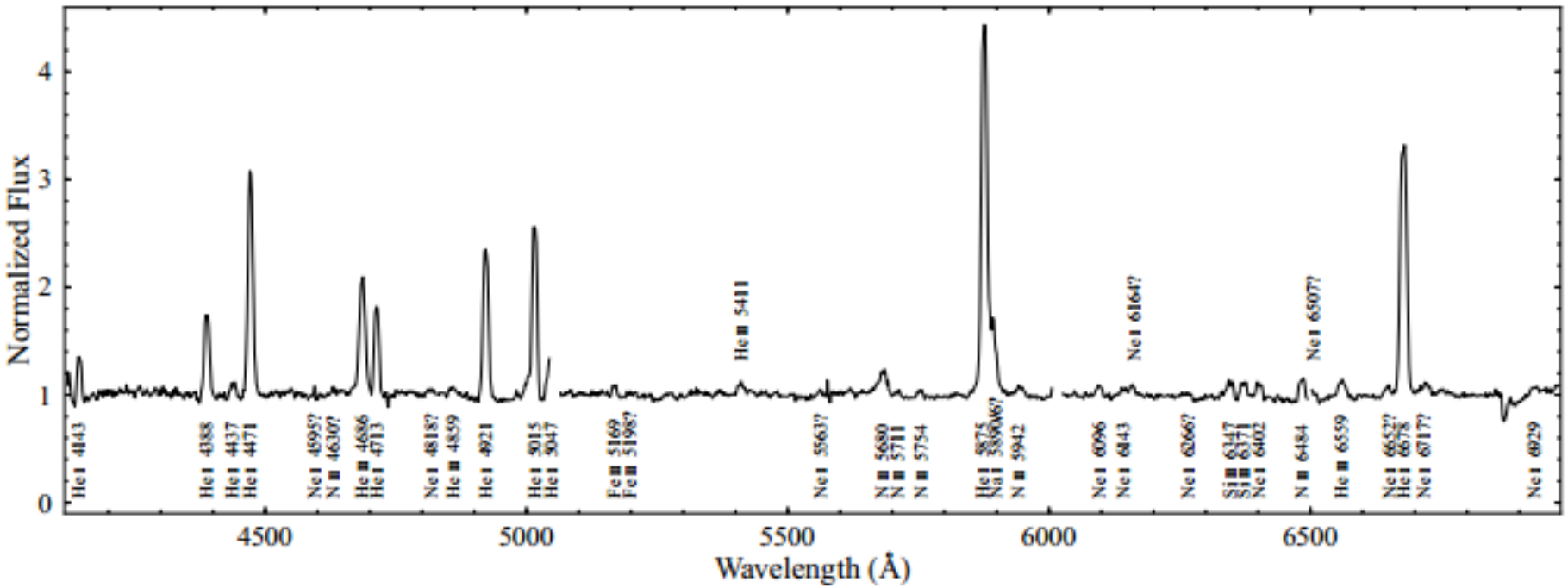


Figure 1. Normalized average spectrum of SDSS J1730 obtained with GMOS. The strong helium lines are prominent, in addition many weak metal lines are detected. The small gaps at 5055 and 6015 Å are due to gaps between the individual CCDs.

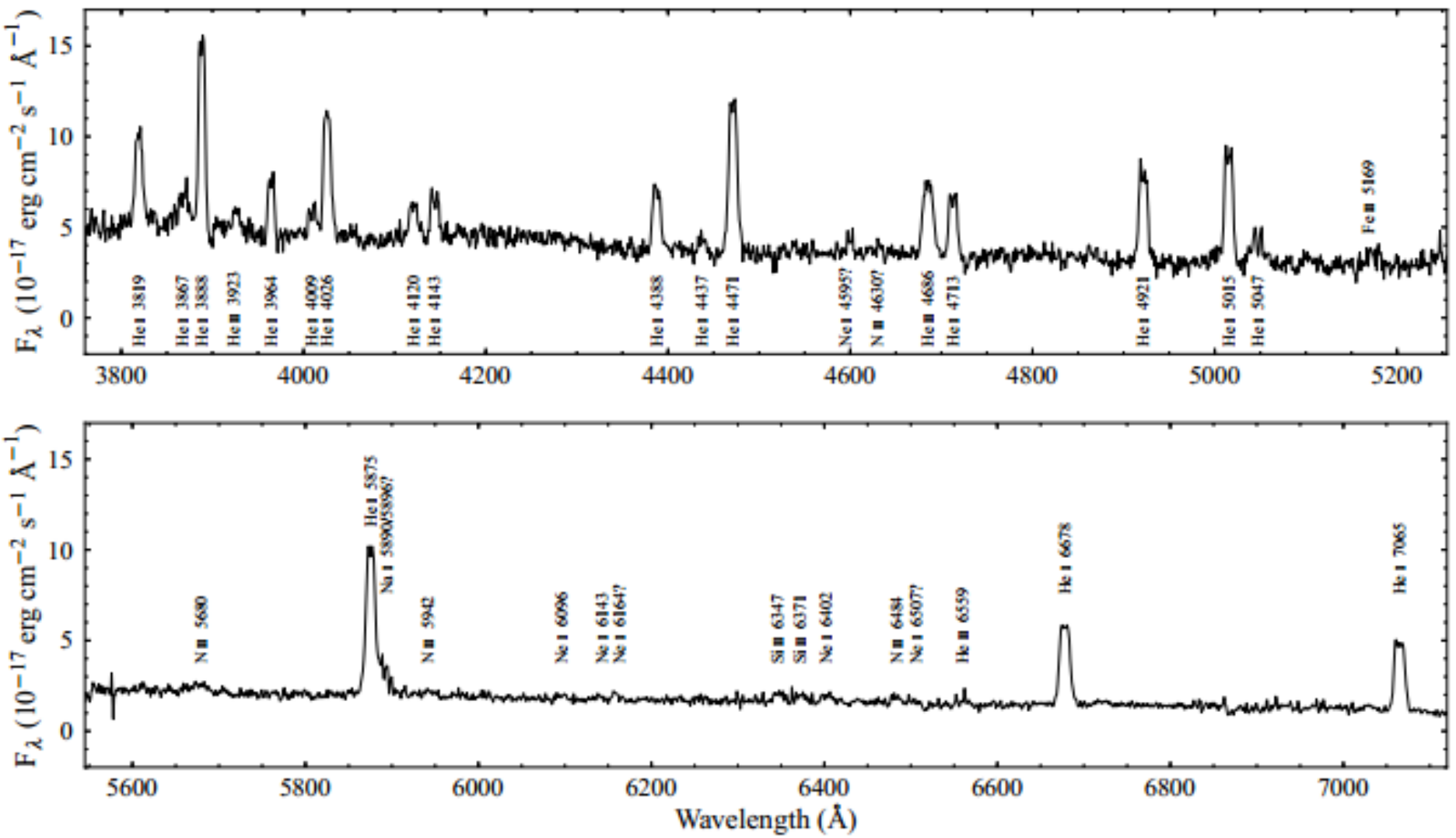


Figure 2. Average spectrum of SDSS J1730 obtained with ISIS. The prominent lines have been labelled.

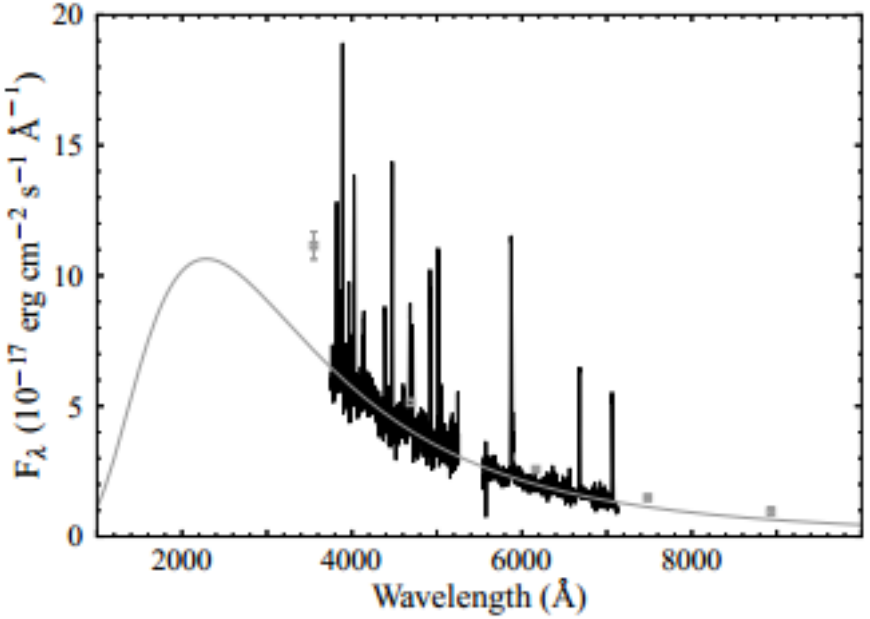


Figure 3. Flux calibrated ISIS average spectrum of SDSS J1730 together with SDSS photometric fluxes (grey squares). The grey line overplotted is a blackbody fit to the spectrum, $T = 12\,700 \pm 100$ K. Data have been corrected for Galactic extinction.

- Se asume que el pico más fuerte de emisión es el de la velocidad radial

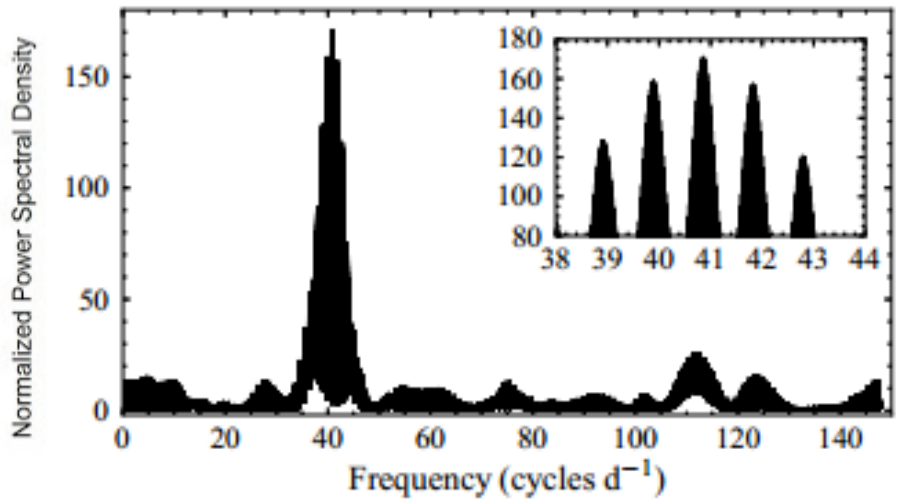
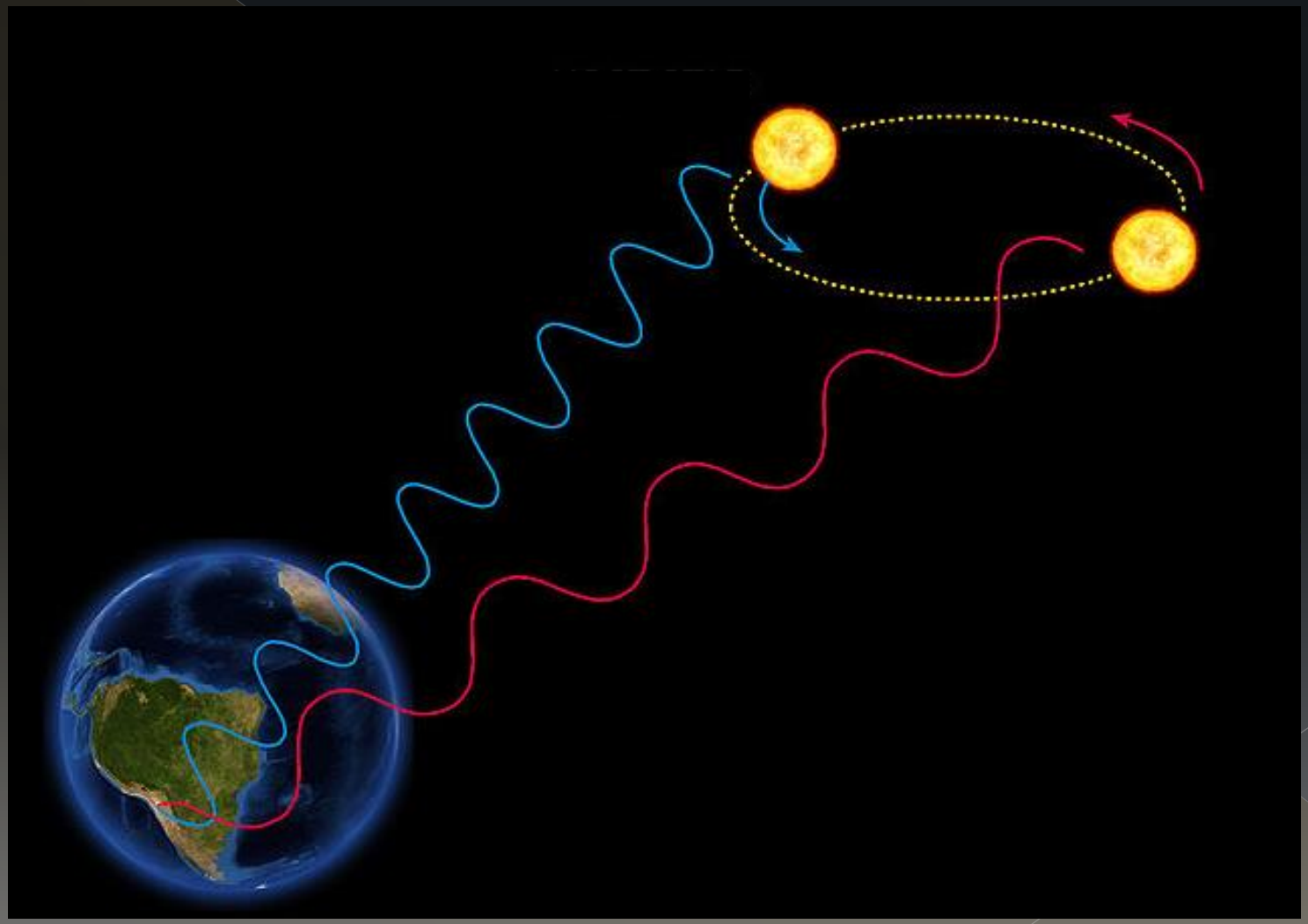


Figure 4. Lomb-Scargle periodogram calculated from the He I radial velocities of SDSS J1730.

Velocidad radial



P_{orb} = 35.2 ± 0.2 minutos

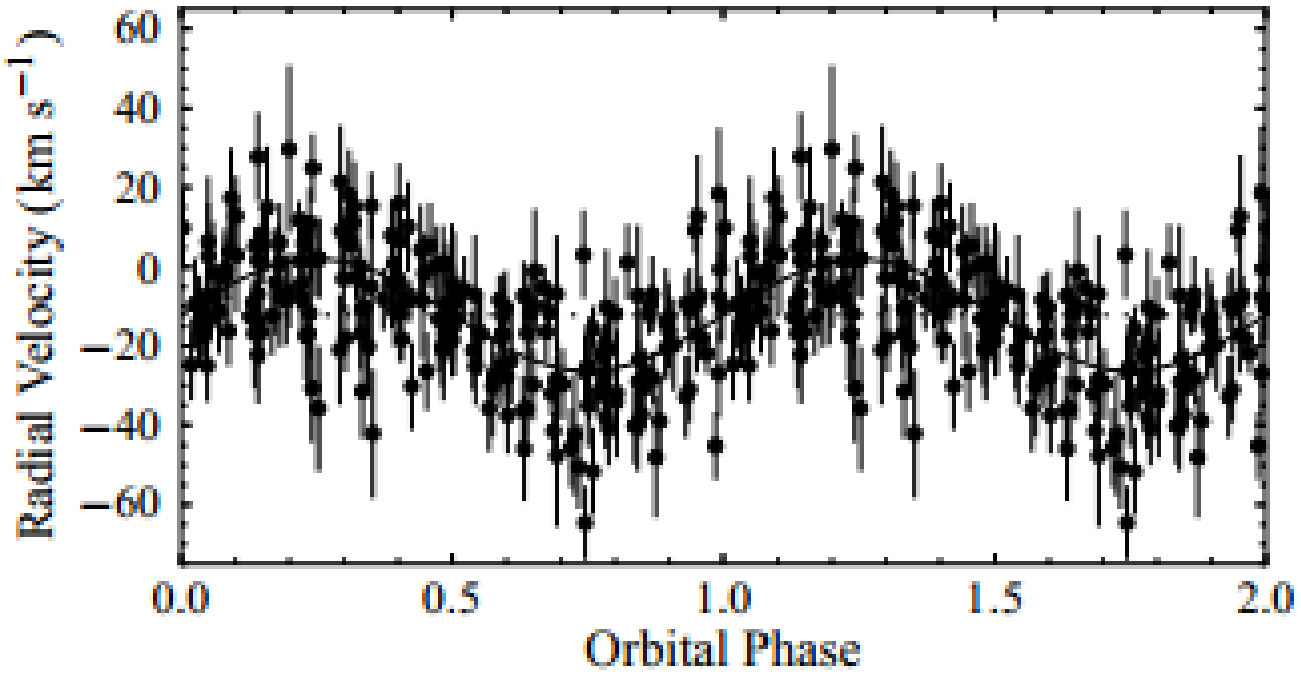


Figure 5. Measured He I radial velocities folded on a period of 35.2 minutes. The solid and dotted lines are the best fit radial velocity curve and γ velocity, the parameters are shown in Table 3.

Table 3. Orbit parameters derived from radial velocity measurements. The orbital period is taken as the strongest peak in the periodogram, and its uncertainty derived using the bootstrap method. The zero phase, velocity amplitude and systemic velocity, and their corresponding uncertainties, result from the fit to equation 1.

$P_{\rm orb}$ (min)	$\mathrm{HJD_0}$	K ($\mathrm{km\,s^{-1}}$)	γ ($\mathrm{km\,s^{-1}}$)
35.2 ± 0.2	2456068.9549(3)	14.2 ± 1.1	-12.2 ± 0.8

$$V(t) = K \sin\left(\frac{2\pi(t - \mathrm{HJD_0})}{P_{\rm orb}}\right) + \gamma,$$

Resultados

- Este sistema binario tiene un periodo corto 35.2+/- 0.2 minutos. Entonces si es del tipo AM CVn binaria.
- Se determinó que la temperatura del disco de acreción es 12700 +/-100 K.
- Se determino que la inclinación del sistema es menor a 11°.

Conclusiones

- Periodo es consistente, sí es del tipo AM CVn binaria.
- Es Valido usar el modelo de cuerpo negro para encontrar la temperatura del de disco acreción.
- La poca inclinación facilita la toma del espectro.