

Periodicity and eclipse minima timing of CM Draconis.

S. Vázquez-Martín¹, H. J. Deeg^{1,2}, S. Dreizler³, C. von Essen^{3,4},
V. P. Kozhevnikov⁵

¹ Dpto. de Astrofísica, Universidad de La Laguna, Spain.

² Instituto de Astrofísica de Canarias, Spain.

³ Institut für Astrophysik Göttingen, Germany.

⁴ Aarhus Institute of Advanced Studies, Denmark.

⁵ Ural Federal University, Ekaterinburg, Russia.

Abstract

Periodic deviations from a linear ephemeris of a binary star's eclipses can indicate the presence of a third body in orbit around both. Hints for such companion around the M4.5/M4.5 binary CMDra were published by [1]. The assignment of a planet in the CMDra system can however only be accepted if the earlier observed periodicity trends can be verified through further observations over several years. For eclipsing binary stars of low mass, the method of eclipse minimum timing allows one to set mass limits for the detection of a third body. [1] concluded that the two possibilities for the source of CMDra's timing variations that remain valid are a planet of a few Jupiter masses on a two decade-long orbit, or an object on a century-to-millennium long orbit with masses $1.5M_J < M_p < 0.1M_\odot$. However, they concluded that it is necessary to do continued observations of the timing of CMDra's eclipses to be decisive regarding the continued viability of the sinusoidal-fit-model, and hence, about the validity of a Jovian-type planet in a circumbinary orbiting around the system. Here we update the analysis of [1], including further data presented in [3] and new observations taken at Ural Observatory (2008-2013). Eclipse minimum times were obtained using the Kwee-van-Woerden method.

References

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- [2] Lacy C.H., 1977, *ApJ*, 218, 444
- [3] Morales J.C., et al., 2009, *ApJ*, 691, 1400