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INTRODUCTION

Cataclysmic variables stars (CVs) are semi-detached binary systems composed of a main sequence star in hours-long orbit around a white dwarf (WD).

Polars are a class of CVs in which the accretion stream follows the intense magnetic field of the WD. In most cases, both stars are locked together in a synchronous rotation.

Their luminosity comes mainly from the accretion spot near one or both magnetic poles of the WD and, in addition to stochastic variations, can be strongly modulated by the orbital motion.

Due to the spiraling motion of the ionized material around the magnetic field line, polars are amongst the strongest astronomical sources of polarized light in the sky.



Figure 1 – Schematics of a polar CV. (Adapted from Hellier, C., 2001¹)

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ABOUT THE TARGET

CRTSJ091936.6-055519 (=CSS0919-05) is a polar CV candidate firstly detected as a variable source by the Catalina Sky Survey, and later observed in exploratory studies by **Drake et al.** (2014)² and **Oliveira et al.** (2020)³, but the orbital period remained undetermined.





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Our work aims at the characterization of the orbital and stellar parameters of CSS0919-05 using the following observational techniques:

Photometry TESS

Soar (Chile)

Polarimetry Pico dos Dias (Brazil)

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PHOTOMETRY



The folded light curves from both sectors shows a noticeable modulation that matches a P=112.5 min period, corresponding to the periodogram's main frequency, associated with the orbital movement



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obtained from TESS sectors 08 and 35 photometric data.

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SPECTROSCOPY

The spectra obtained at the 1.60 m telescope from Pico dos Dias Observatory in December 2020 and January 2021 are similar to those published by Drake et al. and Oliveira et al.

Main features:

- Double-peaked emission lines superposed on a flat continuum.
- Hβ 4861Å emission line as intense as the He II 4686Å, a typical feature in polar CVs.
- Radial velocity of Hβ 4861Å and He II 4686Å emission lines well adjusted with the period found during the photometry analysis.



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Average spectra per observation

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CONCLUSION AND FUTURE WORK

In this work, we have determined the previously unknown orbital period of T=112.5 min of the polar CV candidate CSS0919-05. The observed spectra shows emission lines compatible with those of known polar CVs and with radial velocities well-adjusted to the period found.

We plan to complete the analysis, including the polarimetry, in the coming weeks and publish our results in the near future.

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This research made use of Lightkurve, a Python package for Kepler and TESS data analysis (Lightkurve Collaboration, 2018).

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