

FIRST RESULTS FOR IPSA VEGA ABOUT THE PHOTOMETRY OF THE STAR QU-VIR, TARGET OF THE BSN PROGRAM.

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Abstract. The BSN program is a collaboration between professional and amateur astronomers to observe eclipsing binary systems, particularly contact binaries. IPSA Vega is taking part by tracking the variable star QU-Vir and collecting data via different telescopes and filters, with the aim of producing standardized light curves. The team plans to continue these observations and study other binary systems in the coming months.

Keywords: binary systems, eclipsing binary, photometry

1 Introduction

The BSN (Binary Systems of South and North) program is a collaborative initiative involving professional astronomers, such as Atila Poro, Mark G. Blackford, and Edwin Budding, as well as amateur astronomers. The project aims to observe and analyze eclipsing binary systems, in particular "contact binaries", where both stars fill their Roche lobes. The systems studied are either recently discovered, or have been little observed for several years. Amateur astronomers can participate by observing these stars over one or more nights and obtaining light curves in V or B photometric bands. As part of this project, the IPSA Vega association used Gaia red filters from the RAPAS project, available at the TJMS observatory, to make observations of the variable star QU-Vir.



Fig. 1. Left: Logo of the association IPSA Vega Right: Logo of the BSN program

2 Observations and data collection

2.1 Presentation of QU-Vir

The star QU-Vir is located in the constellation Virgo. It is an EW-type variable star, characterized by a short period (0.399249 days or approx. 9.58 hours) and a modest magnitude variation (from 11.75 to 12.06). These

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stars are known as eclipsing variables, and are made up of two stars in contact, forming ellipsoids. Variations in system brightness are often less than 0.8 magnitude in the V filter.

2.2 Means of observation

Observations were carried out mainly at the Jean-Marc Salomon Observatory (TJMS), located in Buthiers in the Île-de-France region, thanks to a collaboration with Planète Sciences IDF. IPSA Vega was able to carry out 61 90-second exposures and 23 120-second exposures with a 600 mm telescope, using the Rapas-Rp filter. In addition, thanks to Anica Lekic's status as a teacher, the association also has access to the telescope network of the Las Cumbres Observatory (LCO), enabling observation with a 400 mm telescope at Mount Teide in Tenerife, where 74 120-second exposures were made using an SDSS-Ip filter.

3 Data analysis and processing

The data collected came from three different nights, using two different telescopes and therefore two different filters. It was therefore necessary to calibrate these data to obtain a standardized magnitude. This process includes correcting for the attenuation of luminous flux due to atmospheric air mass, adjusting for differences in brightness between the instruments, and correcting for discrepancies linked to the filters used. Unfortunately, only one filter is used for each data set. As a result, it is impossible to calibrate the color of the stars. It is therefore impossible to compare the magnitude of the LCO and TJMS datasets rigorously. Consequently, the results are still expressed in instrumental magnitude. Further adjustments will be necessary.

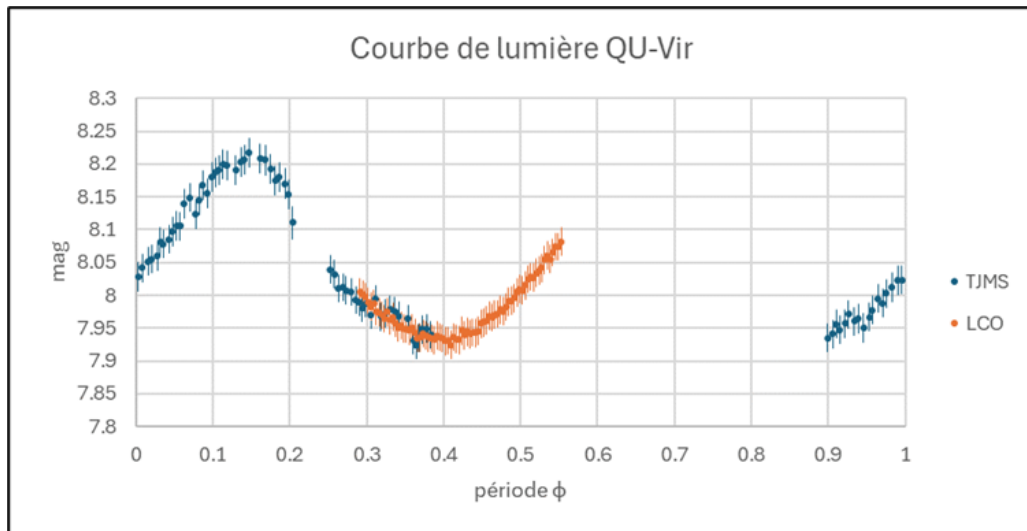


Fig. 2. Curve of the evolution of magnitude of the star QU-Vir as a function of its period

4 Conclusions

Over the coming months, IPSA Vega will continue to observe the QU-Vir system in V and B bands, as recommended by Atila Poro's team. The results obtained will be transmitted to the BSN program for further analysis. In addition, the means of observation will be extended, with the potential use of the T120 telescope at the Observatoire de Haute-Provence (OHP) and other instruments in the LCO network, `telescope.live`, as well as the Jean-Marc Salomon telescope. The association also plans to analyze another binary system, V2228 Ori, in the autumn. This system had already been studied in January 2024 without success, without obtaining a usable light curve. IPSA Vega hopes to present concrete results at the next SF2A symposium in 2025.

We would like to thank Planète Sciences for allowing us to use their telescope. We would also like to thank the CPS for their collaboration. Special thanks to Atila Porro, Mark G. Blackford and Edwin Budding for their participation and investment in this research.