Detection of regular low-amplitude photometric variability of the magnetic dwarf WD0009+501. On the possibility of photometric investigation of exoplanets on the basis of 1-meter class telescopes of the special and crimean astrophysical observatories

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Abstract

© 2015, Pleiades Publishing, Ltd. We present the results of photometric observations of the weak magnetic white dwarf WD0009+501. The observations were carried out for two years with the 1-m telescopes of the Special and Crimean Astrophysical Observatories. As a result of these observations, we detected regular V-band luminosity variations with a period of $P \approx 8$ hours. The amplitude of the variability is stable on timescales greater than two years and amounts to 11 ± 1 mmag. The difference in the variability amplitude from observations with different telescopes is 1–3 mmag. The result is interpreted within the concept of a rotation-modulated variability of magnetic properties of the star's atmosphere. We also discuss a possible variability due to the presence of planetary companions around stars of this type. The results of monitoring were used to explore the capabilities of the telescopes for exoplanet investigation. We studied the dependences between the characteristic times of exposures, magnitudes of the objects, and a threshold level of the expected variability amplitudes for all the telescopes involved in our program. A program of exoplanet monitoring with the mentioned telescopes was drawn up for the next few years based on the results of the study.

Keywords