

# IS PZ MON A RED DWARF OR A RED GIANT?

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**ABSTRACT.** Hipparcos data (ESA 1997) give for PZ Mon a parallax  $\pi = 0.71 \pm 1.17$  mas that is not in agreement with earlier estimations of distance to the star of 15–30 ps and with its status of K- dwarf. There are presented spectra of PZ Mon in the region 3750–6150 Å with resolution of  $\sim 7$  Å, which were carried out in the Nasmith focus of 2.6 m reflector in the Crimean Astrophysical observatory. Intensities of molecular absorptions in this spectral range are determined relative a nearby continuum and their relations between absolute magnitudes are considered. The calculated  $M_v=6.74$  and  $r=29$  ps correspond to an earlier classification of PZ Mon as a red dwarf.

**Key words:** Stars: stellar spectra, red dwarfs; individual: PZ Mon.

Spectral and photometric features of PZ Mon indicate that the star belongs to flare red dwarfs. Different authors estimated of distance to the star as 16–30 ps (Munch L., Munch G. 1955, Gliese 1982; Stobie et al. 1989; Gershberg et al. 1999). The value of X-ray luminosity measured by *Einstein* is  $\log L_x=28.1$ . According relation between X-ray luminosity and a distance obtained for red dwarfs by Metanomski et al. (1998) the star is not far than 30 ps. But *Hipparcos* measurements given a parallax of  $0.71 \pm 1.17$  mas. According this value and taking into account that the brightness of the star  $V=9.03$  Saar (1998) found that a distance is not less than 500 ps. He studied high resolution spectra in the range of  $6170 \pm 20$  Å for a red dwarf and a red giant. Basing on the obtained result and photometric features of PZ Mon he suggests that the star is K1 - giant in a RS CVn system.

In March 2008 two CCC-spectra of PZ Mon were carried out in the Nasmith focus of 2.6 m reflector at the Crimean Astrophysical Observatory. The range of 3700–6100 Å are covered, a spectral resolution was  $\sim 7$  Å. A low spectral resolution did not allow to use such indicator of an absolute stellar magnitude as the ratio  $I_{4063}/I_{4077}$  (Martynov 1976). Pettersen and Hawley (1989) presented results of a spectral survey of red dwarfs where using low resolution spectra in the region of 3600 – 9000 Å they found empirical relations between absolute magnitudes and intensity of diatomic and triatomic molecules.

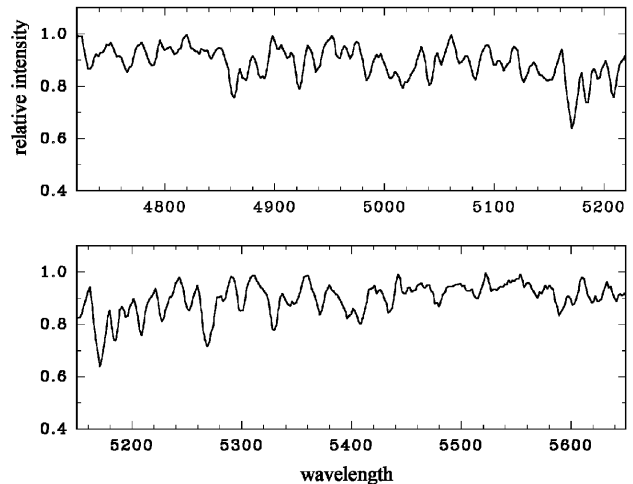


Figure 1: Spectrum of PZ Mon in the visual region

Basing on these relations for estimation of  $M_v$ , we chosen in the PZ Mon spectra bands of TiO (4760, 4950, 5450 Å) and band of CaOH (5550 Å). The bands intensities were determined relative a nearby peaks towards the blue. Measurements in TiO-bands given  $M_v=5-7.2$ , intensity of the CaOH (5550 Å) absorption corresponds to  $M_v=9.1$ , and the mean value of  $M_v$  is 6.74. Then a distance to PZ Mon is not more than 29 ps, that is in agreement with values  $M_v=6.97$  and  $r=25.7$  ps, obtained by Pettersen and Hawley (1989). So, photospheric properties, intensities of molecular absorptions in the visual range, indicate that PZ Mon is a red dwarf. But we suggest that for red dwarfs and red giants there is needed a comparative analysis of high resolution spectra in wide region to take obviously evidences in this question.

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