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New eclipsing binary in Lacerta

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Abstracts: *In the course of my investigation of known variable stars on a regular basis, nearby stars are sometimes detected as variables. One of these is USNO-B1.0 1443-0412484 in the vicinity of EP Lacerta.*

Introduction

The observations were carried out with two semiautomatic telescopes, 8-inch and 14-inch Schmidt-Cassegrain ones, operated at my private observatory. Before 2008, both telescopes were equipped with cooled SBIG ST6 CCD-cameras. Beginning with 2008, these cameras are replaced with SIGMA 1603 cameras, containing a cooled Kodak KAF1603ME chip. Normally, the exposures are 60 s through a Ir & UV cut off filter.

Observations

Differential magnitudes are calculated using GSC 3986-0690 as comparison star ("a" in the chart). The constancy of the comparison is controlled using several check stars in the field, one of them GSC 3986-0231 got the label "b" in the chart. The maximum sensitivity of the chip in the ST6 is in the red part of the spectrum, and that of the KAF1603ME chip is at 640 nm. Therefore rough instrumental magnitudes are calculated simply by adding the R-magnitude of the comparison star taken from the USNO-B1.0 catalogue to the differential magnitudes. The coordinates are also taken from the USNO-B1.0 catalogue.

Data analysis

Concentric aperture photometry is carried out by means of a self-written program, after bias, dark- and flatfield correction of the exposures. All together the new eclipsing variable USNO-B1.0 1443-0412484 was observed through 21 nights between Oct. 2004 and Oct. 2013. In 13 cases minima or parts of them could be detected. The minima timings are to be published in the BAV-Mitteilungen. It becomes evident, that the secondary minima are very shallow. A linear least squares fit to the timings of the primary minima has given:

USNO-B1.0 1443-0412484:

Koord (2000): RA 22 26 33.497 DE +54 23 06.09

Max : 12.99 (instr.) Min I: 13.43 (instr.) Min II = 13.02 (instr.)

Type: Algol type eclipsing binary

Min I = HJD 2455034.3913 + 1.447357* E

+-0.0008 +- 0.000001

With this ephemeris, a phased lightcurve could be constructed. (Fig 1).

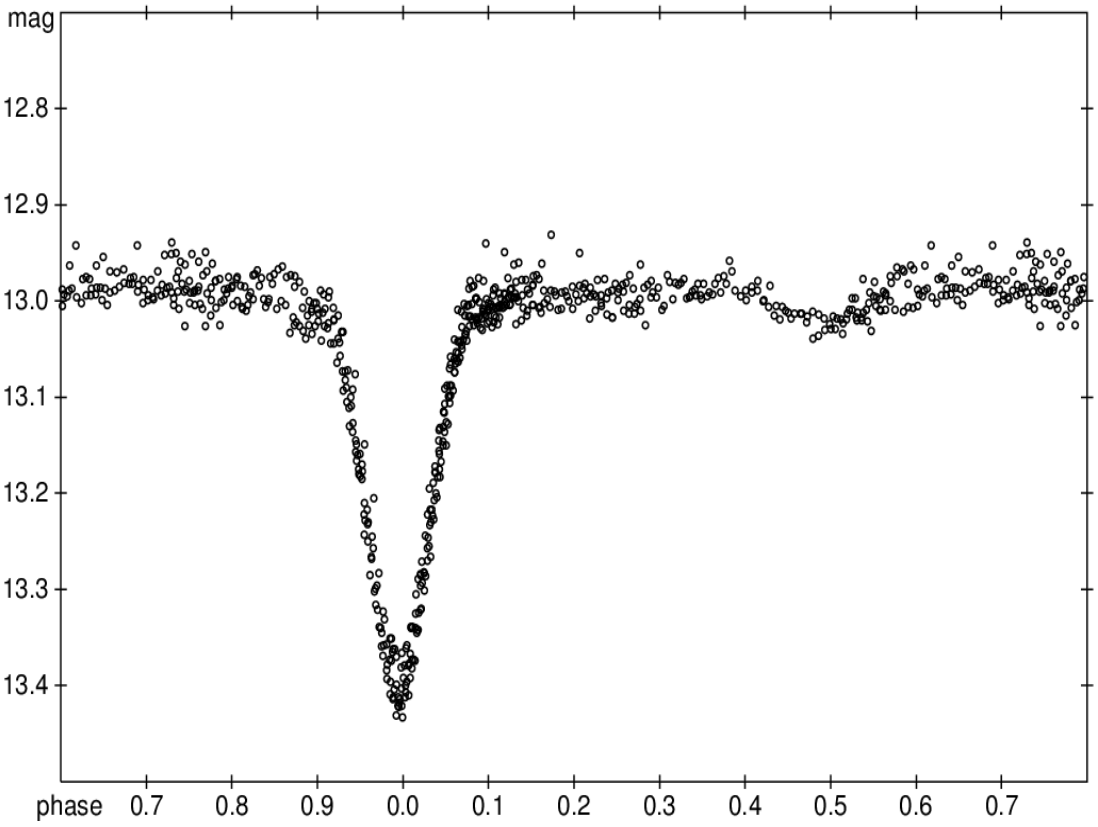

Fig 1: Phased lightcurve of USNO-B1.0 1443-0412484 using the ephemeris given

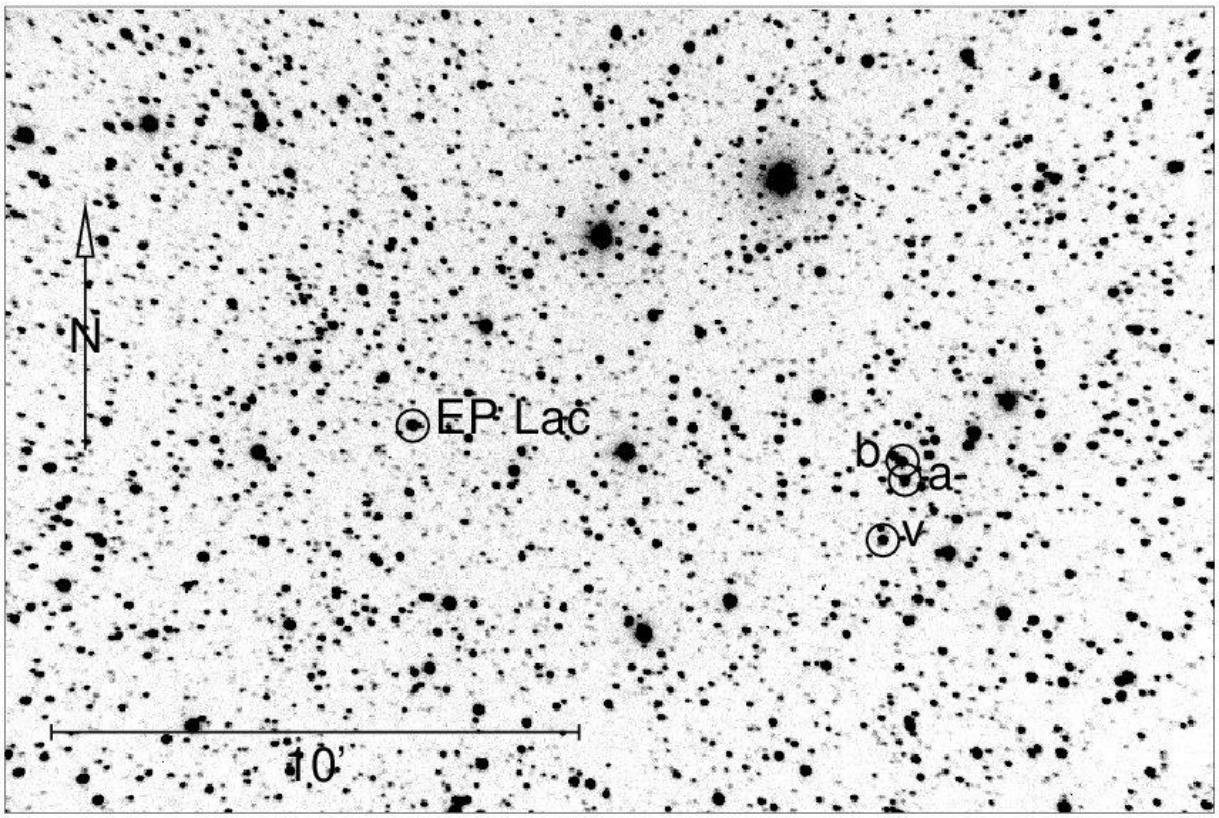

Fig 2: The new variable USNO-B1.0 1443-0412484 (v) in the field of EP Lac. (a) is the comparison and (b) the check star.

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This research has made use of the International Variable Star Index (VSX) database, operated at AAVSO, Cambridge, Massachusetts, USA.