

# SEARCH FOR PERIODS AND VARIABILITY TYPE DETERMINATION OF NEW VARIABLE STARS AL ARI, FM LEO, LL AQR, V1125 TAU, V1366 ORI

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**ABSTRACT.** Measurements of brightness of stars AL Ari, FM Leo, LL Aqr, V1125 Tau, V1366 Ori opened in "HIPPARCOS" experiment are carried out using negatives of the Odessa observatory. The authors classify all these stars to be EA type-variables with ephemerids 2448163.549+3.7474335E (AL Ari), 2448202.975+3.3643328E (FM Leo), 2439359.462 + 494.597E (LL Aqr), 2445699.335 + 8.5912498E (V1125 Tau) and 2444986.278 + 15.7298348E (V1366 Ori).

**Key words:** Stars: Binary: Eclipsing, Individual: AL Ari, FM Leo, LL Aqr, V1125 Tau, V1366 Ori.

## History of research

Analysis of photo-electric measurements series of "HIPPARCOS" experiment allow Roger W. Sinnott to inform in electronic version of magazine "Sky & Telescope" that new variable stars AL Ari, FM Leo, LL Aqr, V1125 Tau, V1366 Ori are of EA type (Sinnott R. W., 2000 & Sinnott R. W., 2000). The same assumption has stated also by Sergey E. Gur'yanov in a magazine "Stargazer" (Gur'yanov S. E., 2000). During the measurements of brightness of stars AL Ari, FM Leo, LL Aqr, V1125 Tau, V1366 Ori using negatives of the Odessa observatory authors used identification cards and stars of comparison from magazines "Sky and Telescope" and "Stargazer". Control visual observations of stars AL Ari and V1125 Tau in 2002 - 2003 has made Andrew S. Semenyuta.

## Results of research of AL Ari

In investigation used eye estimations of Alexandr P. Solonovich for the star AL Ari (HIP 12657, F8) carried out using Neiland - Blazko method on 233 photographic plates as well as 49 measure-

ments of brightness AL Ari on basis of "HIPPARCOS" data. Amplitude of fluctuations of brightness of the star AL Ari founded: 9.4m - 10.1m in V rays.

As a result of search of period Ivan S. Brukhanov established using Lafler - Kinman method that the star AL Ari is a variable of EA type with the following elements of brightness change:

$$H.J.D.min = 2448163.549 + 3.7474335 * E,$$

where  $D = 0.04 P$  or 3.6 hours (according to "HIPPARCOS" data duration of the eclipse is 3.36 hours) for the primary minimum. Below graph of the eclipse fluctuations of brightness of the star shown.

It is partial eclipse. Epoches of moments of minimums has determined: 2446679,579 and 2448163,549 H. J. D.

## Results of research of FM Leo

In investigation used eye estimations of Alexandr P. Solonovich for the star FM Leo (HIP 54766, F8) carried out using Neiland - Blazko method on 322 photographic plates as well as 49 measurements of brightness FM Leo on basis of "HIPPARCOS" data. Amplitude of fluctuations of brightness of the star FM Leo founded: 8.55m - 9.1m in V rays.

As a result of search of period Ivan S. Brukhanov established using Lafler - Kinman method that the star FM Leo is a variable of EA type with the following elements of brightness change:

$$H.J.D.min = 2448202.975 + 3.3643328 * E,$$

where  $D = 0.056 P$  or 4.5 hours for the primary minimum. Below graph of the eclipse fluctuations of brightness of the star shown.

Classical Algol. Epoches of moments of minimums has determined: 2447264,318 and 2448202,975 H. J. D.

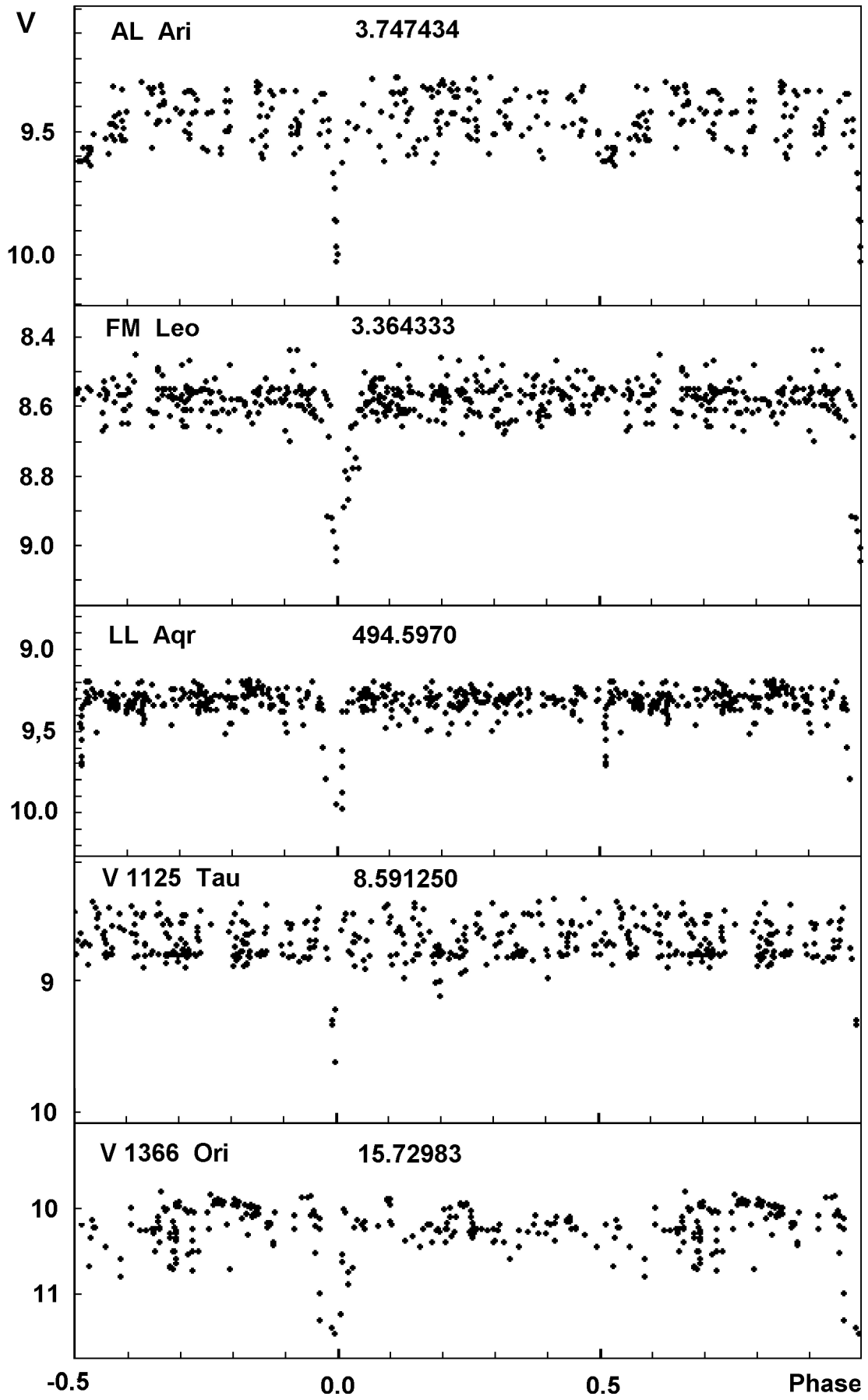


Figure 1: Phase light curves of the stars studied

### Results of research of LL Aqr

In investigation used eye estimations of Ivan S. Brukhanov for the star LL Aqr (HIP 111454, G0) carried out using Neiland - Blazko method on 354 photographic plates as well as 67 measurements of brightness LL Aqr on basis of "HIPPARCOS" data. Amplitude of fluctuations of brightness of the star LL Aqr founded: 9.3m - 10.0m in V rays.

As a result of search of period Ivan S. Brukhanov established using Lafler - Kinman method that the star LL Aqr is a variable of EA type with the following elements of brightness change:

$$H.J.D.min = 2439359.462 + 494.597 * E,$$

where  $D = 0.05 P$  or approximately 25 days for the primary minimum as well as less than  $D = 0.01 p$  or approximately 5 days for the secondary minimum. Below graph of the eclipse fluctuations of brightness of the star shown.

Epoches of moments of minimums has determined: 2439359.462 and 2448762.573 H. J. D. Authors suppose that the main eclipse is partial. This remains undecided.

### Results of researches V1125 Tau

In investigation used eye estimations of Ivan S. Brukhanov for the star V1125 Tau (HIP 17024, G0) carried out using Neiland - Blazko method on 219 photographic plates as well as 83 measurements of brightness V1125 on basis of "HIPPARCOS" data. Amplitude of fluctuations of brightness of the star V1125 Tau founded: 8.7m - 9.6m in V rays. As a result of search of period Ivan S. Brukhanov established using Lafler - Kinman method that the star V1125 Tau is a variable of EA type with the following elements of brightness change:

$$H.J.D.min = 2445699.335 + 8.5912498 * E,$$

where  $D = 0.02 P$  or approximately 3 hours for the primary minimum. Below graph of the eclipse fluctuations of brightness of the star shown.

Epoches of moments of minimums has determined: 2445699.335 and 2448336.806 H. J. D. Possibly we see the secondary minimum at phase 0.2. To confirm these period and type of variability we need long and precise photo-electric measurements of brightness of V1125 Tau.

### Results of research of V1366 Ori

In investigation used eye estimations of Ivan S. Brukhanov for the star V1366 Ori (HIP 24552, A0) carried out using Neiland - Blazko method on 133 photographic plates as well as 82 measurements of brightness V1366 Ori on basis of "HIPPARCOS" data. Amplitude of fluctuations of brightness of the star V1366 Ori founded: 9.9m - 11.5m in V rays.

As a result of search of period I. Brukhanov established using Lafler - Kinman method that the star V1366 Ori is a variable of EA type with the following elements of brightness change:

$$H.J.D.min = 2444986.278 + 15.7298348 * E,$$

where  $D = 0.06 P$  or approximately 23 hours,  $D$  approximately equal to  $d = 0.03 P$  for the primary minimum. Below graph of the eclipse fluctuations of brightness of the star shown.

Epoches of moments of minimums has determined: 2444907.501 and 2444986.278 H. J. D. Variations of brightness noted outside eclipses within 9.9m - 10.8m. To confirm these period and type of variability we need long and precise photo-electric measurements of brightness of V1366 Ori.

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