# Times of Minima of Selected Eclipsing Binaries Obtained in 2023-2024

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### Abstract

We present 66 times of minima of 35 eclipsing binaries obtained with the IST40 telescope of the Istanbul University Observatory between May 2023 - May 2024.

#### Özet

Bu çalışmada İstanbul Üniversitesi Gözlemevinin İST40 teleskobuyla Mayıs 2023 - Mayıs 2024 tarihleri arasında 35 farklı örten çift yıldız için elde edilen 66 minimum zamanı sunulmaktadır.

Key words: binaries: eclipsing - methods: observational - techniques: photometric

#### 1 Introduction

In the framework of monitoring variable stars from Istanbul University Observatory, we obtained minima times of various eclipsing binaries. Monitoring eclipse timings can be very useful as due to various mechanisms such binary systems show orbital period variations. These mechanisms can be caused by mass transfer between companions, magnetic activity, mass loss from the system or orbital period modulation due to an unseen companion. In the latter case, eclipse timings variation (ETV) is used as a fundamental tool to detect exoplanets or stellar third bodies.

Target systems were selected based on their brightness (V < 15) and orbital period  $(P < 1^d)$ . Targets were selected from the General Catalogue of Variable Stars (GCVS) (Samus' et al. 2017) and The Zwicky Transient Facility Catalog of Periodic Variable Stars (Chen et al. 2020). As the transparency of the sky at the Beyazit Campus is very variable, we focus mainly on short period binaries displaying W UMa (EW) and Algol-type (EA) light variations in order to obtain their entire light curves or only minima profiles for the measurements of light minima of a given eclipsing binary in a single observation.

The variable star monitoring program is conducted as a training for the undergraduate students of the Astronomy and Space Sciences Department of Istanbul University. The program is performed mainly by the 2nd, 3rd and 4th-year students with an increasing interest from the junior and MSc students as well.

#### 2 Observations and Data Reduction

All observations presented in this study were carried out with the 0.4m Schmidt-Cassegrain telescope (aka. IST40) of the Istanbul University Observatory. The telescope is located in

the university campus at Beyazit, Istanbul (N 41°01167, E 28°96528, altitude 65 m).

Observations were performed with a thermoelectrically cooled CCD consisting a KAF-8300 chip which has  $3358\times2536$  pixels. Pixel size of 5.4  $\mu m$  yields 0″.27 pixel $^{-1}$  resolution at the focal plane and this resolution allows to capture16 $''\times12''$  field of view.

All frames were bias, dark and flat-field corrected in a standard manner. Several bias and dark frames were combined in order to create a master calibration frame. Flat-fielding was performed using sky flats obtained at dusk. Calibration images were taken each observing night. The log of observations is given in Table 1.

Instrumental magnitudes were determined with aperture photometry using *Muniwin* software of the C-Munipack package (Hroch 2014). Photometry procedures of the C-Munipack package are based on the well-known DAOPHOT (Stetson 1987) package. To give an impression to the reader, we provide an example light curve of the V2822 Ori system in Fig. 1.

Minimum times of eclipsing binaries were computed with the help of Peranso software (Paunzen & Vanmunster 2016) which uses Kwee and van Woerden method (Kwee & van Woerden 1956). This method requires a homogeneous temporal coverage of the minimum light with an odd number of data points forming a symmetrical profile. Thus, we use the data halfway from the eclipse center at each side. In result, we omit eclipses when the descending or the ascending portion of the light curve is not complete. In this way, we ensure the precision of the minima times given in Table 2. All times in the table were converted into Heliocentric Julian Date (HJD).

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# 10 Beyaz, C. et al.

Table 1. Log of observations. Star name <ZTF> represents "ZTF J200814.08+173019.2". Observers are as follows; YD: Yasin Dalkılıç, CB: Canday Beyaz, MTS: Mustafa Turan Sağlam, EA: Esat Akkaşoğlu, ZT: Zafer Toy, MIE: Melike İlayda Eryılmaz, ANO: Aleyna Nur Öztürk, FIK: Fatmanur İlayda Keleş, ANA: Asuman Nura Altınöz, SE: Sedanur Eroğlu, HE: Hilal Erişti, MBB: Muhammed Baki Bayram, EC: Elif Çolak, OU: Özkan Utuş, SB: Safahan Başara, EG: Elanur Güler, SOT,SO: Sibel Ötken, SOZ: Sezer Özel, MI: Mehmet İçen, MA: Mübin Atmaca, SF: Sajed Fateh, IZK: İrem Zeynep Kelkitli, EED: Elif Ece Devecioğlu, YEC: Yunus Emre Çetinkaya, EbS: Ebubekir Şark, HK: Hasan Kalay, ES: Elif Şafak, BE: Burak Erdoğan, MuO: Muhammet Özcan, ZE: Zeynep Erol, EG: Ege Gültekin, RIC: Rabia İrem Çevik, IK: İrem Kişmir, AK: Ada Köken, VU: Volkan Uzuğ, BD: Batıkan Demirel, YAL: Yağız Altıkulaç, YA,YAV: Yusuf Avcıoğlu, LFT: Latife Fatıma Türkoğlu, SA: Samet Ayhan, ST: Sudenur Tırak, IE: Ilgın Ertekin, AK: Ayşenur Köse, OD: Özge Deveci, SK: Selin Kedik, SC: Sevgi Çulpan, AI: Aykut Işıktaş, II: İrem İlhan, KNK: Kifayet Nur Kın

(ym-d)         2460000+         (h)         Type         Framesi         (s)           2023-05-29         09.29738 - 09.471495         4.89         XY Boo         EW         208         1         50           2023-05-29         09.29738 - 09.46500         4.16         AR Boo         EW         200         V         60         MTS           2023-07-21         143.32857 - 148.547849         5.71         V426 Feg         EW         221         R         60         YEC,ANO,HE,CB           2023-07-21         165.095769 - 156.568038         6.53         -27F>         EW         194         V         90         YDE,GLZK,SE,ZT,RIC,HE           2023-08-01         150.568038         6.53         -27F>         EW         194         V         90         YDE,GLZK,SE,ZT,RIC,HE           2023-08-01         163.34471         163.449474         3.34         Y010 Cyg         EW         286         V         30         SC,OU,ES           2023-08-01         163.2486799         162.252817         5.33         Y010 Cyg         EW         278         V         60         SE,C,ND           2023-08-24         180.296493         180.476710         4.93         MR Del         EA         1508         V	Date	JD Interval	Duration	Star	Variable	Number of	Filter	Exp. Time	Observers
2023-05-24         89.267337         89.471495         4.89         XY Boo         EW         268         I         50         EA.ES           2023-05-25         90.392382         90.465600         4.16         AR Boo         EW         200         V         60         MTS           2023-07-21         147.310103         147.547973         5.71         V626 Peg         EW         232         R         60         YCC,ANO,HE,CB           2023-07-21         165.295769         165.68038         6.53         V365 Spc         EW         210         V         90         YD,EG,IZK,SE,ZT,RIC,HE           2023-08-03         165.295769         165.68038         6.53         V1918 Cyg         EW         640         V         30         MTS,MEB           2023-08-03         163.294684         161.462322         3.9         V117 Aql         EW         345         V         30         SO,0 LES           2023-08-05         163.294888         163.434074         3.34         V417 Aql         EW         345         V         30         SD,0 LES         YD           2023-08-01         103.477107         13.40         MR Del         EA         291         V         45         SD,0 ULES,EX	(y-m-d)	2460000+	(h)		Туре	Frames		(s)	
2021-02-24       09.207337       09.407437       0.50       EW       200       V       60       MTS         2022-07-21       129.334228       129.4662309       3.07       V2477       Cyg       EW       325       V       200       V       60       WTS         2022-07-21       143.328567       148.547849       5.26       V1282 Aql       EA       170       V       90       YD,ES,IR,ES,EZ,T,RIC,HE         2023-07-21       165.295769       156.56038       6.53       -27T>       EW       194       V       90       YD,EG,IZK,SE,ZT,RIC,HE         2023-08-01       156.395769       156.56038       6.53       -47T>       EW       194       V       90       YD,EG,IZK,SE,ZT,RIC,HE         2023-08-01       163.944807       1.6442322       380       V117 Aql       EW       306       V       30       YEA,ANO,HE,CE         2023-08-02       10.394461       1.6449322       330       V117 Aql       EW       134       V       45       YD         2023-08-21       14.344074       3.34       V117 Aql       EW       134       V       45       SO,0U,ES,EA         2023-08-21       101.34475079       3.11       RY Aqf	2002 05 04	00.067527 00.471405	4.00	VV D.	۲\۸/	260		50	
2022-023         90.2223-03.3323         19.436309         3.0         V2477 Cyg         EW         345         V         20         VDSB.MIE,EED           2023-07-21         147.310103         147.347973         5.71         V026 Peg         EW         232         R         60         VPC,ANO,HE,CB           2023-07-22         14.325867         14.847749         5.71         V026 Peg         EW         210         V         90         VD,SB,II           2023-07-22         150.595769         156.56038         6.53         V1918 Cyg         EW         400         V         30         MTS,MEB           2023-040         161.299646         161.462322         3.93         V117 AqI         EW         345         V         30         SO.0LES           2023-040         161.299646         161.462322         3.93         V17 AqI         EW         345         V         30         SB           2023-040         161.299648         163.44047         3.4         V17 AqI         EW         134         V         45         YD           2023-040-1         19.34704.10649241         3.4         MR DeI         EA         1506         V.5         SO.0ULES,CA           2023-040-1	2023-05-24	89.207537 - 89.471495	4.89			208	I V	50	
2023-07-21       143-35-23       147-547973       5.71       V025 Peg       EW       232       R       60       YEC,ANO,HE,CB         2023-07-21       148.325867       145.547849       5.26       V1282 Aql       EA       170       90       YD,EG,IZK,SE,ZT,RIC,HE         2023-07-30       156.295769       155.566038       6.53       <2TF>       EW       194       V       90       YD,EG,IZK,SE,ZT,RIC,HE         2023-08-01       150.334711       160.564081       5.53       V1918 Cyg       EW       360       V       30       MTS,MBB         2023-08-04       16.3986471       16.42322       30       V17.642322       30       V17.65,RIMB       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.165       50       V0.55       50       V0.165       50       V0       50       50       V0.165       50       V0.55       50       V0.165       70       50       V	2023-05-25	90.292382 - 90.403000	4.10			200	v	20	
2022-07-22         147.310.39         1.11.301.39         1.11.301.39         1.11.301.39         1.11.301.39         1.11.301.31         1.11	2023-07-03	129.334236 - 129.402309	5.07	V2477 Cyg		345	V D	20	
2023-07-20       163.253671       145.37649       3.2.0       Viazo Aqii       E.A.       170       V       90       YD_EG,IZK,SE,T,RC,HE         2022-07-30       156.295769       155.566038       6.5.3        <2TF>       FW       194       V       90       YD_EG,IZK,SE,T,RC,HE         2022-08-02       150.3342171       160.564981       5.5.3       V1918 Cyg       EW       360       V       30       SC,OULES         2023-08-04       161.296646       161.42322       30       V17 Aql       EW       345       V       30       YEC,ANO.HE,CB         2023-08-04       163.296789       -162.258817       5.3       V1918 Cyg       EW       278       V       60       SB,EG,YD         2023-08-21       169.347704       160.489241       3.40       VAT Aql       EW       231       V       30       SB         2023-08-21       183.279073       110       MR Del       EA       1508       V       5       EED,EG,MIE         2023-08-20       186.240685       187.47707       510       MR Del       EA       1154       R       7       ZT,FIK         2023-09-01       197.366730       10       MR Del       EA       11	2023-07-21	147.310103 - 147.347973	5.71	V020 Feg		170		00	VD SP II
2023-07-30       150.293/09       100.293/09       100.293/09       100.293/02 <td>2023-07-22</td> <td>140.320307 - 140.347049</td> <td>5.20</td> <td>V 1020 Aqi</td> <td></td> <td>210</td> <td>v</td> <td>90</td> <td></td>	2023-07-22	140.320307 - 140.347049	5.20	V 1020 Aqi		210	v	90	
2022-01-30       130.293109       130.390       140.390<	2023-07-30	150.295709 - 150.506056	0.55			210	v	90	TD,EG,IZK,SE,ZT,RIC,HE
2022-08-03       160.334471       160.564981       53       V1910 Cyg       EW       040       V       30       SO,OU,ES         2023-08-03       161.296646       161.462322       3.93       V417 Aql       EW       345       V       30       YEC,ANO,HE,CB         2023-08-05       163.294888       163.434074       3.34       V417 Aql       EW       134       V       45       YD         2023-08-21       163.04888       163.44074       3.34       V417 Aql       EW       134       V       45       YD         2023-08-21       180.269493       180.475019       4.93       MR Del       EA       1508       V       5       EED,EG,MIE         2023-08-21       183.296302       183.475707       4.31       RYA qr       EA       300       V       30       YD,SE         2023-08-21       168.24685       166.476750       5.0       MR Del       EA       1154       R       7       ZT,FIK         2023-09-10       190.25116       198.439920       4.52       MR Del       EA       1154       R       7       ZT,FIK         2023-09-12       202.537940       20.434676       3.56       V190       SE       V	2023-07-30	150.295709 - 150.506056	0.55	<zif></zif>		194	v	90	TD,EG,IZK,SE,ZI,RIC,RE
2022-08-04       161.298646       161.642322       333       Vi17.40       EW       345       V       30       YEC,ANO,HE,CB         2022-08-05       162.306789       162.252817       5.33       Vi17.40       EW       248       V       30       YEC,ANO,HE,CB         2023-08-06       162.306789       163.34074       3.4       Vi17.40       IEW       245       YD         2023-08-21       169.347704       169.489241       3.40       MR Del       EA       291       V       30       SB         2023-08-23       180.259493       160.475019       49       MR Del       EA       1508       V       5       EED,EG.MIE         2023-08-23       183.256302       183.25707       7.06       V373 Del       EW       427       V       45       SO,OU,ES         2023-08-20       183.256302       183.475707       3.1       RY Aqr       EA       330       V       30       VDS,E         2023-09-12       20.25219-1       162.54085       180.476750       5.10       MR Del       EA       511       V       20       YD         2023-09-12       20.253797       02.449676       5.10       MR Del       EA       511	2023-08-02	159.321029 - 159.595254	0.58	V1918 Cyg		040	v	30	
2022-08-04       101.29024       5.33       V31 Aqi       EW       343       V       30       TEL,ANKO,TEL,DB         2022-08-05       163.296488       163.434074       3.34       V417 Aqi       EW       134       V       45       YD         2023-08-12       160.34704       13.40       MR Del       EA       291       V       30       SB         2023-08-12       160.34704       130.475019       4.93       MR Del       EA       1508       V       5       EED,EG,MIE         2023-08-21       183.295032       183.475707       4.31       RY Aqr       EA       330       V       45       HE,YEC,CB         2023-08-29       183.296032       183.475707       4.31       RY Aqr       EA       330       V       40       SE,YD,SB         2023-09-19       197.366730       197.473908       2.57       V700 Cyg       EW       202       V       40       SE,YD,SB         2023-09-12       200.25219       -200.544554       7.02       V685 Peg       EW       359       V       60       ZT,FIK,IZK         2023-09-12       203.275040       -202.549794       204.49676       3.56       V1918 Cyg       EW       144	2023-00-03	161 209646 161 462222	2.22	V1916 Cyg		300	v	30	
2022-08-03       102.30109 - 102.32617       5.33       V100 Cyg       EW       276       V       00       SB_ES, TD         2022-08-03       163.29488       163.434074       3.44       MR Del       EA       291       V       30       SB         2023-08-21       1663.29488       180.269493       180.269493       180.269493       180.269493       180.269493       180.269493       180.269493       180.269493       180.269493       181.573072       7.06       V373 Del       EW       427       V       45       SO,OU,ES,EA         2023-08-21       186.264085       183.47570       4.11       RY Aqr       FA       300       YD,SE         2023-09-21       197.36750       5.10       MR Del       EA       501       V       20       YD         2023-09-12       202.26972       200.544554       7.02       V685 Peg       EW       320       V       45       SO,OU,ES         2023-09-12       202.26972       202.549740       203.449695       5.04       V626 Peg       EW       335       R       60       FIK,ANA,ZT,IZK         2023-09-12       203.2506750       5.02       144568 Peg       EW       325       R       60       FIK,ANA,ZT,IZK <td>2023-08-04</td> <td>101.298040 - 101.402322</td> <td>3.93 E 22</td> <td>V417 Aqi</td> <td></td> <td>345</td> <td>v</td> <td>30</td> <td></td>	2023-08-04	101.298040 - 101.402322	3.93 E 22	V417 Aqi		345	v	30	
2022-060       103.2340074       5.34       V41 Aqi       EW       134       V       435       TD         2023-06-12       180.37704       106.489241       3.40       MR Del       EA       1508       V       5       EED,EG,MIE         2023-06-21       181.279073       181.573072       7.06       V373 Del       EW       427       V       45       SO,OU,ES,EA         2023-06-21       183.296302       183.475707       4.31       RY Aqr       EA       330       V       30       YD,SE         2023-06-21       183.296730       197.473908       2.57       V700 Cyg       EW       202       V       40       SE,YD,SB         2023-09-12       200.25219       201.65429       108.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       20.252797       20.2054554       7.02       V685 Peg       EW       350       K       60       ZT,FIK,IZK         2023-09-12       20.257970       20.254894       7.02       V685 Peg       EW       315       K       60       FIK,ANA,ZT,IZK         2023-09-12       20.3206222       20.4462679       5.50       V488 Peg       EW	2023-00-05	162 204999 162 424074	2.22	V/00 Cyg		270	v	00	SB,EG, FD
2023-06-12       109.3491/144 - 109.49241       3.40       Mik Dei       EA       150       SD       50         2023-06-23       180.269493       180.269493       180.269493       SD       SD       SD       SD         2023-06-23       180.269493       180.256143       SE2.524145       SE2.524145       SD       V       45       HE,YEC,CB         2023-08-26       183.296302       183.475707       4.31       RY Aqr       EA       330       V       30       YD,SE         2023-08-29       186.264085       186.476750       5.10       MR Del       EA       1154       R       7       ZT,FIK         2023-09-10       198.251516       198.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       20.2537979       6.44       V685 Peg       EW       314       V       45       SO,OU,ES         2023-09-12       20.35779740       -204.449676       5.6       V108 Cyg       EW       145       SO,OU,ES         2023-09-12       20.332092       20.445844       6.44       V685 Peg       EW       316       V       45       YD,SE         2023-01-02       23.8262686	2023-08-00	160 247704 160 490241	3.34	V417 Aqi		134	v	45	
2023-06-23       180.70973       180.70073       180.70073       180.70073       180.70073       180.70073       180.70073       181.750073       7.06       V373 Del       EW       261       V       45       SO,0U,ES,EA         2023-08-24       183.296302       183.296302       183.475707       4.31       RY Aqr       EA       330       V       30       YD,SE         2023-08-29       186.264065       166.476750       5.10       MR Del       EA       1154       R       7       ZT,FIK         2023-09-09       197.366730       -197.473908       2.57       V700 Cyg       EW       202       V       40       SE,YD,SE         2023-09-10       198.251516       198.43920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       203.275040       203.484987       7.02       V685 Peg       EW       358       V       60       ZT,FIK,IZK         2023-09-12       203.375040       207.499784       6.44       V685 Peg       EW       318       R       70       UB/NA,ZY,IZK         2023-09-12       203.30262       210.342675       5.02       V485 Peg       EW       358       R       60	2023-00-12	109.347704 - 109.469241	3.40			291	v	30 F	
2023-06-24       181.2/19073 - 181.3/1072       7.000       V373 Del       EW       421       V       43       SOUGO:ES,EA         2023-06-25       182.365582 - 182.524145       381       V1918 Cyg       EW       261       V       45       HE,YEC,CB         2023-08-29       186.264085 - 186.476750       5.10       MR Del       EA       1154       R       7       ZT,FIK         2023-09-10       197.366730 - 197.473908       2.57       V700 Cyg       EW       202       V       40       SE,YD,SB         2023-09-10       198.251516 - 198.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       202.537979       6.44       V685 Peg       EW       314       V       45       SO,OU,ES         2023-09-12       202.357979       6.44       V685 Peg       EW       314       V       45       YEC         2023-09-12       201.3572104       -203.449467       5.5       V1918 Cyg       EW       164       V685 Peg       EW       316       V100       DL,BA/SA       YEC         2023-09-12       201.350212       202.450294       5.42       N48       Feg       EW       158       N	2023-08-23	180.209493 - 180.475019	4.93			1508	v	5	
2023-08-25       162.30366 - 102.324143       3.61       V1916 Cyg       EW       201       V       45       PHE, FEC, CB         2023-08-29       168.264085 - 186.476750       5.10       MR Del       EA       1154       R       7       ZT, FIK         2023-08-29       166.264085 - 186.476750       5.10       MR Del       EA       501       V       20       VD       40       SE, YD, SB         2023-09-10       198.251516 - 198.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-11       198.251516 - 198.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       202.252799       0.44       V685 Peg       EW       314       V       45       SO,OU,ES         2023-09-15       203.275040 - 203.484989       5.04       V626 Peg       EW       315       R       60       FIK,ANA,ZT,IZK         2023-09-12       203.320206 - 210.541575       5.02       V485 Peg       EW       326       V       50       AS       YD,SB         2023-10-12       233.206262       230.486218       3.97       V485 Peg       EW       251       V       60	2023-08-24	181.279073 - 181.573072	7.00	V3/3 Del		427	V	45	SU,UU,ES,EA
2023-08-29       183.4930/2 - 183.47510/7       4.31       RT Aqr       EA       330       V       30       YD.SE         2023-08-29       186.264085       51.0       MR Del       EA       1154       R       7       ZT,FIK         2023-09-10       198.251516       -198.439920       4.52       MR Del       EA       501       V       20       YD         2023-09-12       202.52219       -200.544554       7.02       V685 Peg       EW       359       V       60       ZT,FIK,IZK         2023-09-12       202.37979       6.44       V685 Peg       EW       415       V       45       SO,OU,ES         2023-09-15       203.275040       -203.484989       5.04       V685 Peg       EW       315       R       60       FIK,ANA,ZT,IZK         2023-09-15       203.297040       -201.541575       5.02       V485 Peg       EW       325       R       60       FIK,ANA,ZT,IZK         2023-10-12       230.30222       -230.486218       3.97       V485 Peg       EW       251       V       60       YD,SE         2023-10-12       230.20392       230.422794       5.28       V685 Peg       EW       251       V       60	2023-08-25	182.305582 - 182.524145	3.81	V1918 Cyg	EVV	201	v	45	HE, YEC, CB
2023-00-29       160.204005 - 160.470/50       5.10       NIK DEI       EA       1134       R       7       21,FIK         2023-00-20       197.366730 - 197.47300       5.10       V 700 Cyg       EW       202       V       40       SE,VD,SB         2023-09-10       200.252119 - 200.544554       7.02       V685 Peg       EW       359       V       60       ZT,FIK,IZK         2023-09-15       202.257040 - 203.449069       5.04       V685 Peg       EW       314       V       45       SO,OU,ES         2023-09-15       207.329420 - 207.599784       6.44       V685 Peg       EW       165       V       40       SB,YD,SE,ANO         2023-09-19       207.329420 - 207.599784       6.49       V685 Peg       EW       326       R       60       FIK,ANA,ZT,IZK         2023-00-12       210.33206 - 210.541575       5.02       V485 Peg       EW       326       V       5       YD,SB         2023-10-12       230.32082 - 230.486218       3.97       V485 Peg       EW       251       V       60       EA,EbS,MA         2023-10-22       240.322639 - 240.45794       5.28       V685 Peg       EW       251       V       60       SE,YD,SB	2023-08-26	183.296302 - 183.475707	4.31		EA	330	V	30	YD,SE
2023-09-10       197.360730 - 197.473008       2.57       V700 Cyg       EW       202       V       40       SE, YD, SB         2023-09-10       198.251516 - 198.43990       4.52       MR Del       EA       501       V       20       YD         2023-09-11       198.251516 - 198.43990       4.52       MR Del       EA       501       V       20       YD         2023-09-15       202.52219 - 202.537979       6.44       V626 Peg       EW       314       V       45       SO,OU,ES         2023-09-15       203.275040 - 203.484989       5.04       V626 Peg       EW       314       V       45       YEC         2023-09-12       201.332206 - 210.541575       5.02       V485 Peg       EW       335       R       60       FIK,ANA,ZT,IZK         2023-10-02       232.826098       238.526266       6.37       V485 Peg       EW       368       V       45       YD,SB         2023-10-22       240.232639 - 240.452794       5.28       V685 Peg       EW       251       V       60       EA,Eb5,MA         2023-10-22       240.232639 - 240.452794       5.28       V685 Peg       EW       251       V       60       EA,Eb5,MA         202	2023-08-29	180.204085 - 180.470750	5.10		EA	1154	ĸ	1	
2023-09-10       198.291516       -198.39920       4.52       Mik Del       EA       501       V       20       YD         2023-09-12       200.252219       200.252219       200.52219       200.52219       200.52219       201.52219       200.52219       202.539779       6.44       V665 Peg       EW       314       V       45       SO,OU,ES         2023-09-15       203.275040       -203.484989       5.04       V665 Peg       EW       314       V       45       YEC         2023-09-19       207.329420       -207.599784       6.49       V685 Peg       EW       325       R       60       FIK,ANA,ZT,IZK         2023-10-12       230.320822       -210.451575       5.02       V485 Peg       EW       222       R       70       OU,BD,YA,SOZ,SOT         2023-10-12       230.320822       -230.486218       3.97       V485 Peg       EW       251       V       60       YD,SB         2023-10-20       238.260998       -38.526266       6.37       V685 Peg       EW       251       V       60       EA,HSA,MAO,LCB         2023-10-20       238.210147       -246.451835       3.16       V909 Cep       EW       255       V       60       Z	2023-09-09	197.300730 - 197.473908	2.57	V700 Cyg	EVV	202	V	40	SE, YD, SB
2123-09-12       200.5425219       200.544554       7.02       Vois Preg       EW       359       V       600       21,FIK,IZK         2023-09-14       202.260720       202.37979       6.44       Vois Preg       EW       420       I       45       SO,OU,ES         2023-09-15       203.275040       -203.484989       5.04       V626 Peg       EW       314       V       45       YEC         2023-09-12       207.329740       -207.59784       6.49       V685 Peg       EW       335       R       600       FIK,ANA,ZT,IZK         2023-09-12       210.332206 - 210.541575       5.02       V485 Peg       EW       222       R       70       CB,ANO,HE,YEC,SO         2023-10-12       230.320622       230.486218       3.97       V485 Peg       EW       251       V       60       FE,HE,ANO,CB         2023-10-22       240.232639       240.452794       5.28       V685 Peg       EW       251       V       60       EA,EbS,MA         2023-11-02       240.232639       240.452794       5.28       V685 Peg       EW       251       V       60       EA,EbS,MA         2023-11-02       250.277844       5.66       K685 Peg       EW	2023-09-10	198.251516 - 198.439920	4.52		EA	501	V	20	
2123-09-14       202.3.09-14       202.3.09-16       203.2.597/40       203.499-16       204.409676       3.56       V1918 Cyg       EW       165       V       40       SB,YD,SE,ANO         2023-09-16       204.301507       -204.449676       3.56       V1918 Cyg       EW       165       V       40       SB,YD,SE,ANO         2023-09-19       207.322420       -207.599784       6.49       V685 Peg       EW       335       R       60       FIK,ANA,ZT,IZK         2023-00-12       223.256579       -225.256579       -225.485306       5.49       BB Peg       EW       346       V       455       YD,SB         2023-10-12       230.320822       -230.486218       3.97       V485 Peg       EW       251       V       60       YE,HE,ANO,CB         2023-10-20       238.260998       -238.526266       6.37       V685 Peg       EW       251       V       60       YE,HE,ANO,CB         2023-11-02       240.32639       -240.452794       5.26       V685 Peg       EW       253       R       60       ZT,AI,SK,SC         2023-11-09       258.311010       -258.546206       5.64       AP Tau       EA       185       V       100       OD,CB	2023-09-12	200.252219 - 200.544554	7.02	V685 Peg	EVV	359	v	60	
2023-09-15       203.09-16       204.301507       204.0107       204.0107	2023-09-14	202.269720 - 202.537979	0.44	V685 Peg		420	I V	45	SU,UU,ES
2023-09-16       204.301507 - 204.44967       3.56       V 1918 Cyg       EW       165       V       40       SB, TD, SE, AND         2023-09-12       207.329420 - 207.599784       6.49       V685 Peg       EW       335       R       60       FIK, ANA, ZT, IZK         2023-09-22       210.332206 - 210.541575       5.02       V485 Peg       EW       346       V       45       YD, SB         2023-10-12       230.320822 - 230.486218       3.97       V485 Peg       EW       251       V       60       YEC, HE, ANO, CB         2023-10-22       240.232639 - 240.452794       5.28       V685 Peg       EW       251       V       60       YEC, HE, ANO, CB         2023-11-02       246.320147 - 246.451835       3.16       V909 Cep       EW       155       V       60       SE, YD, SB         2023-11-02       256.320954 - 256.475844       5.66       V685 Peg       EW       253       R       60       ZT, AI, SK, SC         2023-11-02       258.31010 - 258.546206       5.64       AP Tau       EA       185       V       100       OD, CB         2023-12-26       305.178512 - 305.411297       5.59       V137 Tau       EW       236       60       HE, ED, SF, EG	2023-09-15	203.275040 - 203.484989	5.04	V020 Peg		314	v	45	
2223-09-19       207.329420       -207.349420       -207.3494200       -207.34942000       -207.349420000       -207.349420000       -207.34942000       -207.349	2023-09-16	204.301507 - 204.449676	3.50	V1918 Cyg		105	V	40	
2023-109-22       210.332206 - 210.3415/5       5.0.2       V485 Peg       EW       322       R       7.0       CB,ANO,HE, YEC,SO         2023-10-12       230.320822 - 230.486218       3.97       V485 Peg       EW       346       V       45       YD,SB         2023-10-22       240.32039 - 240.452794       5.28       V685 Peg       EW       251       V       60       YEC,HE,ANO,CB         2023-10-22       240.32039 - 240.452794       5.28       V685 Peg       EW       251       V       60       EA,EbS,MA         2023-10-28       246.320147 - 246.451835       3.16       V909 Cep       EW       155       V       60       SE,YD,SB         2023-11-09       258.311010 - 258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-25       305.178512 - 305.411297       5.59       V1377 Tau       EW       423       R       40       ZT         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       130       V       50       EED,YEC,ZE,MuO <t< td=""><td>2023-09-19</td><td>207.329420 - 207.599784</td><td>0.49</td><td>V085 Peg</td><td></td><td>335</td><td>R</td><td>60 70</td><td></td></t<>	2023-09-19	207.329420 - 207.599784	0.49	V085 Peg		335	R	60 70	
2023-10-07       225.250579       -222.483500       5.49       BB Peg       EW       346       V       45       YD,SB         2023-10-12       230.320822       -230.486218       3.97       V485 Peg       EW       158       R       70       OU,BD,YA,SOZ,SOT         2023-10-22       230.230822       -230.486218       3.97       V485 Peg       EW       251       V       60       YEC,HE,ANO,CB         2023-10-22       240.232639       -240.452794       5.28       V685 Peg       EW       251       V       60       EA,EbS,MA         2023-11-02       256.329954       -256.475844       5.66       V685 Peg       EW       253       R       60       ZT,AI,SK,SC         2023-11-07       256.31010       -258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-26       305.178512       -305.411297       5.59       V1377 Tau       EW       231       V       15       MIE,EED,SF,EG         2024-02-03       342.216207       -342.41638       4.82       V132 <tau< td="">       EW       233       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071       -344.423142       4.08</tau<>	2023-09-22	210.332206 - 210.541575	5.02	V485 Peg	EVV	222	R	70	CB,ANO,HE,YEC,SO
2023-10-12       230.30622 - 230.486218       3.97       V465 Peg       EW       158       R       70       OU,BJ, YA,SDZ,SUT         2023-10-20       238.260998 - 238.526268       6.37       V685 Peg       EW       251       V       60       YEC,HE,ANO,CB         2023-10-22       240.232639 - 240.452794       5.28       V685 Peg       EW       251       V       60       EA,EbS,MA         2023-10-22       240.320639 - 240.452794       5.28       V685 Peg       EW       253       R       60       ZT,ALSK,SC         2023-11-09       258.311010 - 258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-26       305.178512 - 305.411297       5.59       V1377 Tau       EW       231       V       15<	2023-10-07	225.250579 - 225.485300	5.49	BB Peg	EVV	340	V	45	
2023-10-20       238.200986       238.200986       5.37       V085 Peg       EW       251       V       60       YEC,HE,ANO,CB         2023-10-22       240.232639       240.452794       5.28       V685 Peg       EW       261       V       60       EA,EbS,MA         2023-10-22       240.320147       246.451835       3.16       V909 Cep       EW       155       V       60       SE,YD,SB         2023-11-07       256.239954       -256.475844       5.66       V685 Peg       EW       253       R       60       ZT,AI,SK,SC         2023-11-09       258.311010       -258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-26       305.178512       -305.411297       5.59       V1377 Tau       EW       423       R       40       ZT         2024-02-01       342.216207       -342.41638       4.82       V1332 Tau       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071       -344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       347.195482       -347.445882       6.01       V28	2023-10-12	230.320822 - 230.486218	3.97	V485 Peg	EVV	158	R	70	
2023-10-22       240.232039 - 240.452794       5.28       V085 Peg       EW       201       V       60       EA,EDS,IMA         2023-10-28       246.320147 - 246.451835       3.16       V909 Cep       EW       155       V       60       SE,YD,SB         2023-11-07       256.239954 - 256.475844       5.66       V685 Peg       EW       253       R       60       ZT,AI,SK,SC         2023-11-09       258.311010 - 258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-26       304.279804 - 304.380008       2.40       RZ Tau       EW       231       V       15       MIE,EED,SF,EG         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       HE,LFT,CB         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-06       347.195482 - 347.445882       6.01       V2822 Ori       EW       303       R       60       ST,CB	2023-10-20	238.200998 - 238.520208	0.37	V685 Peg	EVV	251	V	60	YEC, HE, ANO, CB
2023-10-28       240.320147       240.4301835       3.10       V909 Cep       EW       155       V       60       SE, YD, SB         2023-11-07       256.239954 - 256.475844       5.66       V685 Peg       EW       253       R       60       ZT,AI,SK,SC         2023-11-09       258.31101 - 258.546206       5.64       AP Tau       EA       185       V       100       OD,CB         2023-12-25       304.279804 - 304.380008       2.40       RZ Tau       EW       231       V       15       MIE,EED,SF,EG         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-22       363.350559 - 363.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,I	2023-10-22	240.232039 - 240.452794	5.28	V085 Peg		201	v	60	
2023-11-07       250.259934 - 250.473844       5.00       V003 Feg       EW       233       K       000       Z1,A,SK,SC         2023-11-09       258.311010 - 258.546206       5.64       AP Tau       EW       231       V       15       MIE,EED,SF,EG         2023-12-25       304.279804 - 304.380008       2.40       RZ Tau       EW       231       V       15       MIE,EED,SF,EG         2023-12-25       305.178512 - 305.411297       5.59       V1377 Tau       EW       423       R       40       ZT         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       HE,LFT,CB         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-22       363.350559 - 363.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB	2023-10-28	240.320147 - 240.451835	3.10 E 66	V909 Cep		155	V D	60	SE, Y D, SB
2023-11-09       258.311010 - 258.340200       5.04       AP Tau       EA       185       V       100       DD,CB         2023-12-25       304.279804 - 304.380008       2.40       RZ Tau       EW       231       V       15       MIE,EED,SF,EG         2023-12-26       305.178512 - 305.411297       5.59       V1377 Tau       EW       423       R       40       ZT         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       HE,LFT,CB         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-05       346.462836 - 349.501800       4.45       EX CMi       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-02       363.350559 - 365.30211       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-22       363.3505493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD	2023-11-07	250.259954 - 250.475644	5.00			200 105	к V	100	
2023-12-25       304.279804 - 304.380008       2.40       RZ Tau       EW       231       V       15       MIE,EED,SF,EG         2023-12-26       305.178512 - 305.411297       5.59       V1377 Tau       EW       423       R       40       ZT         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-24       365.230559 - 363.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB	2023-11-09	256.511010 - 256.540200	5.04			105	v	100	
2023-12-20       303.176312 - 303.176312 - 303.411297       5.59       V1377 Tau       EW       423       K       40       21         2024-02-01       342.216207 - 342.416838       4.82       V1332 Tau       EW       236       V       60       HE,LFT,CB         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-05       346.462836 - 349.501800       4.45       EX CMi       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-22       363.350559 - 363.502411       3.64       TY UMa       EW       182       R       60       ST,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SE         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG <td>2023-12-25</td> <td>304.279804 - 304.380008</td> <td>2.40</td> <td>KZ Tau</td> <td></td> <td>231</td> <td>V D</td> <td>15</td> <td></td>	2023-12-25	304.279804 - 304.380008	2.40	KZ Tau		231	V D	15	
2024-02-01       342.210207 - 342.410636       4.62       V1332 Tau       EW       230       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       KV Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-06       347.195482 - 347.445882       6.01       V2822 Ori       EW       303       R       60       ZT,ANO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-24       365.230559 - 365.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD </td <td>2023-12-20</td> <td>305.176512 - 305.411297</td> <td>5.59</td> <td>V1377 Tau</td> <td></td> <td>425</td> <td>к V</td> <td>40</td> <td></td>	2023-12-20	305.176512 - 305.411297	5.59	V1377 Tau		425	к V	40	
2024-02-03       344.253071 - 344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-03       344.253071 - 344.423142       4.08       V404 Gem       EW       213       V       60       YD,SB,SE,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-06       347.195482 - 347.445882       6.01       V2822 Ori       EW       303       R       60       ZT,ANO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-22       363.350599 - 365.202411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MBE,SOZ,SO	2024-02-01	342.210207 - 342.410030	4.02	VISS2 Tau		230 212	v	60	
2024-02-03       344.2530/1 - 344.423142       4.06       V404 Gem       EW       213       V       00       TD,35,3E,EC,IE         2024-02-05       346.462836 - 346.563362       2.41       NY Leo       EW       130       V       50       EED,YEC,ZE,MuO         2024-02-06       347.195482 - 347.445882       6.01       V2822 Ori       EW       303       R       60       ZT,ANO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-22       363.350559 - 365.302411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       372       V       20       CB	2024-02-03	344.253071 - 344.423142	4.00	V404 Cam		213	v	60	
2024-02-05       340.402230 - 340.303302       2.41       NY Leo       EW       130       V       50       EED, YEC, ZE, MIDO         2024-02-06       347.195482 - 347.445882       6.01       V2822 Ori       EW       303       R       60       ZT, ANO         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST, CB         2024-02-22       363.350559 - 365.502411       3.64       TY UMa       EW       195       R       60       LFT, HE, IZK, SA, CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD, SE, SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB, IK, AK, VU, BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE, EED, SF, EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB, SOZ, SO         2024-04-14       412.325413 - 412.451930       3.04       XY Leo       EW       372       V       20       CB     <	2024-02-03	344.253071 - 344.423142	4.00	V404 Gem		215	v	60 E0	
2024-02-00       347.193462 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-08       349.316426 - 349.501800       4.45       EX CMi       EW       182       R       60       ST,CB         2024-02-22       363.350559 - 363.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14	2024-02-05	340.402030 - 340.303302	2.41			202	V D	50 60	
2024-02-06       349.310420 - 349.301800       4.43       EX CMI       EW       162       R       60       ST,CB         2024-02-22       363.350559 - 363.502411       3.64       TY UMa       EW       195       R       60       LFT,HE,IZK,SA,CB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.54458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15	2024-02-00	347.193462 - 347.445662	0.01	VZ6ZZ Uri		303	R D	60	
2024-02-22       365.350393 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-02-24       365.230559 - 365.492686       6.29       HN Cnc       EW       332       V       60       YD,SE,SB         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.54458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-0	2024-02-08	262 250550 262 502411	4.45			102	R D	60	
2024-02-24       305.250539 - 305.492060       0.29       TIN CHC       EW       352       V       00       TD,5L,3B         2024-03-10       380.365493 - 380.452065       2.08       BS UMa       EA       86       V       70       SB,IK,AK,VU,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.54458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       336       V       20       ZE,YEC,MuO,MIE,MI <td>2024-02-22</td> <td>265 220550 265 402686</td> <td>6.20</td> <td></td> <td></td> <td>195</td> <td>N V</td> <td>60</td> <td></td>	2024-02-22	265 220550 265 402686	6.20			195	N V	60	
2024-03-10       380.303493 - 380.492005       2.06       B3 0Ma       LA       60       V       70       3B,R,AR,V0,BD         2024-03-18       388.317932 - 388.389850       1.73       XY Leo       EW       173       V       20       MIE,EED,SF,EG         2024-04-05       406.317813 - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       348       V       20       CB         2024-04-11       412.469409 - 412.582438       2.71       BI CVn       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.54458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-02-24	200 265402 200 452065	0.29			332 96	v	70	
2024-03-16       386.317932       386.3693050       1.73       X1 Edo       EW       173       V       20       IMIL, EED, S7, EG         2024-04-05       406.317813       - 406.553819       5.66       V356 Leo       EW       270       V       60       MBB,SOZ,SO         2024-04-11       412.325413       - 412.451930       3.04       XY Leo       EW       348       V       20       CB         2024-04-11       412.4519409       - 412.582438       2.71       BI CVn       EW       372       V       20       CB         2024-04-13       414.319036       - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752       - 415.544458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537       - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-03-10	200 217022 200 20050	2.00			172	v	20	
2024-04-05       400.317313 - 400.303819       5.00       V356 EW       270       V       00       MBB,302,30         2024-04-11       412.325413 - 412.451930       3.04       XY Leo       EW       348       V       20       CB         2024-04-11       412.469409 - 412.582438       2.71       BI CVn       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.544458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-03-18	406 217912 406 EE2910	1.75	V2E6 Loo		270	v	20	MPP SO7 SO
2024-04-11       412.329413 - 412.491930       3.04       XT Leo       LW       346       V       20       CB         2024-04-11       412.469409 - 412.582438       2.71       BI CVn       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.544458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-04-05	400.317813 - 400.353819	2.00	V350 Leo		210	v	20	MBB,302,30
2024-04-11       412.409409 - 412.302436       2.71       BLCVII       EW       372       V       20       CB         2024-04-13       414.319036 - 414.612145       7.03       VW Cep       EW       176       B       50       YD,SE         2024-04-14       415.265752 - 415.544458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-04-11	412.323413 - 412.431930	3.04 3.71	RI CV/n		270	v	20	CB
2024-04-13       415.265752 - 415.544458       6.69       MM Com       EW       1636       V       52       SB,HK         2024-04-15       416.265537 - 416.392806       3.05       XY Leo       EW       336       V       20       ZE,YEC,MuO,MIE,MI         2024-04-26       427.279966 - 427.579730       7.19       RZ Com       EW       358       V       60       MBB.SOZ.SO	2024-04-11 2024-04-12	412.409409 - 412.302438 /1/ 310036 / /1/ 6131/5	2.11 7.03			176	v R	∠0 50	
2024-04-15         416.265537         - 416.392806         3.05         XY Leo         EW         336         V         20         ZE,YEC,MuO,MIE,MI           2024-04-26         427.279966         - 427.579730         7.19         RZ Com         EW         358         V         60         MBB.SOZ.SO	2024-04-13	115 265752 . 115 511/150	6.60	MM Com		1626	0 V	50	SB HK
2024-04-26 427.279966 - 427.579730 7.19 RZ Com EW 358 V 60 MBB.SOZ.SO	2024-04-14	416 265537 - 116 202206	3.05		E\//	336	v V	20 20	
	2024-04-26	427.279966 - 427.579730	7.19	RZ Com	EW	358	v	60	MBB,SOZ,SO

Table 2 – continued.

Table 2. List of minimum times. Table lists UT date, minimum time (HJD), uncertainty of the minimum, filter of observation, and the type of the minimum. Star name  $<\!ZTF\!>$  represents "ZTF J200814.08+173019.2".

Star	UT Date	$T_{min}$	Uncertainty	Filter	Min.
	(y-m-d)	(HJD 2400000+)	(days)		Туре
V417 Aql	2023-08-04	60161.3336	0.0003	V	Ш
V417 Aql	2023-08-06	60163.3796	0.0036	V	I
V1828 Aql	2023-07-22	60148.3722	0.0001	V	Ш
V1828 Aql	2023-07-22	60148.4280	0.0002	V	I
V1828 Aql	2023-07-22	60148.4834	0.0007	V	Ш
V1828 Aql	2023-07-22	60148.5385	0.0002	V	I.
RY Aqr	2023-08-26	60183.3955	0.0002	V	I
AR Boo	2023-05-25	60090.3740	0.0021	V	I.
XY Boo	2023-05-24	60089.4098	0.0008	1	I.
VW Cep	2024-04-13	60414.4419	0.0006	В	Ш
VW Cep	2024-04-13	60414.5839	0.0021	В	I.
V909 Cep	2023-10-28	60246.4128	0.0006	V	I
EX CMi	2024-02-08	60349.3668	0.0004	R	I.
HN Cnc	2024-02-24	60365.2673	0.0002	V	I
MM Com	2024-04-14	60415.3051	0.0003	V	Ш
MM Com	2024-04-14	60415.4589	0.0003	V	I
RZ Com	2024-04-26	60427.3587	0.0001	V	Ш
RZ Com	2024-04-26	60427.5276	0.0005	V	I.
BI CVn	2024-04-11	60412.5103	0.0001	V	I.
V700 Cyg	2023-08-05	60162.4441	0.0001	V	1
V700 Cyg	2023-09-09	60197.4646	0.0001	V	Ш
V1918 Cyg	2023-08-02	60159.5323	0.0002	V	Ш
V1918 Cyg	2023-08-03	60160.3583	0.0019	V	Ш
V1918 Cyg	2023-08-25	60182.4632	0.0003	V	1
V1918 Cyg	2023-09-16	60204.3610	0.0006	V	1
V2477 Cyg	2023-07-03	60129.4037	0.0001	V	I.
MR Del	2023-08-12	60169.4035	0.0009	V	Ш
MR Del	2023-08-23	60180.3581	0.0005	V	Ш
MR Del	2023-08-29	60186.3588	0.0034	R	1
MR Del	2023-09-10	60198.3593	0.0026	V	1
V373 Del	2023-08-24	60181.3294	0.0002	V	1



**Figure 1.** An example light curve of V2822 Ori obtained with IST40 telescope. Light curve is given in instrumental magnitudes and Julian Day fraction. Details can be seen in Table 2.

Star	UT Date (y-m-d)	T <sub>min</sub> (HJD 2400000+)	Uncertainty (days)	Filter	Min. Type
V373 Del	2023-08-24	60181.5071	0.0003	V	
KV Gem	2024-02-03	60344.2693	0.0001	V	11
V404 Gem	2024-02-03	60344.2972	0.0003	V	I.
NY Leo	2024-02-05	60346.5084	0.0002	V	1
XY Leo	2024-03-18	60388.3643	0.0002	V	11
XY Leo	2024-04-11	60412.3707	0.0002	V	1
XY Leo	2024-04-15	60416.3470	0.0001	V	1
V356 Leo	2024-04-05	60406.4612	0.0002	V	1
V2822 Ori	2024-02-06	60347.3020	0.0001	R	Ш
V2822 Ori	2024-02-06	60347.4260	0.0001	R	I.
BB Peg	2023-10-07	60225.2911	0.0001	V	I.
BB Peg	2023-10-07	60225.4730	0.0010	V	Ш
V485 Peg	2023-09-22	60210.4089	0.0016	R	Ш
V485 Peg	2023-10-12	60230.3965	0.0034	R	11
V626 Peg	2023-07-21	60147.4166	0.0001	R	Ш
V626 Peg	2023-07-21	60147.5359	0.0001	R	I.
V626 Peg	2023-09-15	60203.2875	0.0003	V	11
V626 Peg	2023-09-15	60203.4074	0.0015	V	I.
V685 Peg	2023-09-12	60200.3587	0.0004	V	11
V685 Peg	2023-09-12	60200.5184	0.0004	V	I.
V685 Peg	2023-09-14	60202.4217	0.0003	I.	I
V685 Peg	2023-09-19	60207.4972	0.0002	R	11
V685 Peg	2023-10-20	60238.2710	0.0005	V	I.
V685 Peg	2023-10-20	60238.4300	0.0008	V	Ш
V685 Peg	2023-10-22	60240.3340	0.0004	V	Ш
V685 Peg	2023-11-07	60256.3551	0.0010	R	I
V365 Sge	2023-07-30	60156.4914	0.0002	V	Ш
AP Tau	2023-11-09	60258.4329	0.0002	V	I
RZ Tau	2023-12-25	60304.3495	0.0001	V	I
V1332 Tau	2024-02-01	60342.3540	0.0033	V	I
V1377 Tau	2023-12-26	60305.2307	0.0001	R	Ш
V1377 Tau	2023-12-26	60305.3720	0.0002	R	I
BS UMa	2024-03-10	60380.4067	0.0003	V	I
TY UMa	2024-02-22	60363.3987	0.0001	R	I
<ztf></ztf>	2023-07-30	60156.4640	0.0008	V	I

### 3 Results

Table 2 lists the minima times that we obtained in this study. Date (UT), minimum time and its uncertainty, filter used in the acquisition of the light curve (B, V, R and I are standard Johnson filters), and the type of the minimum are given in the table as well as the star name. Min. I refers the deeper minimum, while the Min. II is when the fainter star is eclipsed. Some stars were observed extensively and has many times of minimum.

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This research made use of Peranso, a light curve and period analysis software.

# 12 Beyaz, C. et al.

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