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**OAN-TNT RESULTS OF OBSERVATIONS - PHOTOELECTRIC MINIMA OF  
SELECTED ECLIPSING BINARIES AND MAXIMA OF PULSATING STARS**

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BELA 12, 14 AND 15 AS WELL AS THE STUDENTS FROM THE ADVANCED OBSERVATIONAL  
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In this first compilation of OAN-TNT results, photoelectric observations of 9 variable stars obtained from 2011 to 2015 are presented giving 50 minima for eclipsing binaries and maxima of pulsating stars. All times of minima and maxima are heliocentric and were determined with a fifth grade polynomial fitting to the light curve. The epoch values and period to determine the  $O - C$  were taken from Kholopov et al. (1985) and are given in days. The values in column  $O - C$  are determined without incorporation of nonlinear terms. The errors were determined from the RMS of the residuals evaluated for the times of maxima and are about 0.016 day. The accuracy of each point is given by the exposure time and varies between 3 min for the 1 m telescope and 1 min for the smaller telescopes. It may seem contradictory to give a longer integration time to the larger aperture telescope. However, this is done since the mounting of the 10-inch telescope is of an altazimuth type, which does not allow long integration times. For the 1-meter telescope there were around 40,000 counts and for the 10-inch telescope there were 11,000 counts, enough to secure high precision.

The stars' coordinates in Table 1 are epoch 2000 and the  $V$  values are given in magnitudes. All information about telescopes, photometers and filters are specified in Tables 2 and 3. In the same Tables the following quantities are listed. Column 1 is the ID, column 2 the time in HJD,  $N$  gives the number of data points in each run and  $\Delta t$  is the time span of the run. Observers and reducers are specified in the remarks to the Tables. The observations were made at both the Observatorio Astronomico Nacional at Tonantzintla (TNT) and San Pedro Martir (SPM), both belonging to UNAM. The CCD reduction was done with AstroImageJ (Collins 2012) and the photoelectric observations were reduced using a classical procedure (see Peña et al. 2012 for details). The photoelectric measurements and all the light curves can be requested for inspection.

**Table 1: Characteristics of the observed stars**

Star	RA (2000)	DEC (2000)	$V$ (mag)	SpType	$T_0$ (d)	$P$ (d)	Observatory
GP And	00 55 18	+23 09 49.36	10.79	A3	2433861.438	0.0786827	SPM
AD CMi	07 52 47	+01 35 50.50	9.38	F3III	2442429.458	0.12297443	TNT & SPM
AZ CMi	07 44 07	+02 24 19.52	6.47	F0III	2440886.071	0.09526	SPM
KZ Hya	10 50 54	-25 21 14.00	10.06	B9III	2442516.158	0.059510421	TNT
EH Lib	14 58 55	-00 56 53.05	9.38	F0	2433438.608	0.088413245	TNT
SZ Lyn	08 09 35	+44 28 17.61	9.43	F2	2438124.398	0.120534920	TNT & SPM
1 Mon	05 59 01	-09 22 56.01	6.16	F2IV	2441661.167	0.136126	TNT & SPM
AE UMa	09 36 53	+44 04 00.39	11.35	A9	2435604.338	0.086017055	TNT & SPM
W UMa	09 43 45	+55 57 09.00	7.85	F8V	2445765.739	0.33363749	TNT

**Table 2: Times of maxima of pulsating stars**

ID	HJD-2450000	$N$	$\Delta t$ (d)	Telescope	Fil	Detector	$O - C$	Observers/Reducers
GP And	6612.7070	32	0.08	84	V	phot	0.0089	JHP,CVR/JHP
	6614.6748	18	0.09	84	V	phot	0.0097	JHP,CVR/JHP,CVR
AD CMi	6333.8206	202	0.13	m1	G	ST8	0.0127	CVR/CVR
	6346.7301	226	0.12	m1	wo	ST8	0.0099	AOA13/ARL
	6614.9390	20	0.09	84	V	phot	0.0076	JHP,CVR/JHP
	6685.7670	182	0.12	1m	G	8300	0.0063	ESAOBELA14/JHP
AZ CMi	6753.6540	99	0.08	m2		phot	0.0114	AOA14/CGS
	6614.9522	19	0.08	84	V	phot	0.0278	JHP,CVR/JHP,CVR
	7088.7971	155	0.16	m1	V	1001	0.0248	AOA15/KVR
	7088.8565	155	0.16	m1	V	1001	0.0246	AOA15R/KVR
	7089.7493	194	0.12	m1	V	1001	0.0248	AOA15R/DSP
	7112.8385	150	0.13	m1	V	1001	0.0239	DSP/DSP
	7112.7789	150	0.13	m1	V	1001	0.0239	DSP/DSP
EH Lib	7112.7798			1m	wo	8300	0.0248	OTA,AS/OTA,AS
	6354.9736	58	0.10	1m	G	1001	0.0061	CVR,DZR/CVR
	6376.8984	120	0.11	1m	G	1001	0.0045	CVR/CVR
	6753.8916	281	0.15	m1	wo	8300	0.0036	AOA14R/CVR
	7088.8023	114	0.06	c11	wo	8300	0.0049	AOA15R/DSP
	7114.7947	52	0.05	m1	V	1001	0.0038	KVR,JGT/DSP
	7172.7920	55	0.07	84	V	phot	0.0020	JGT,AS/JHP
	7175.7990	32	0.05	84	V	phot	0.0030	AS/JHP
	7177.8310	43	0.09	84	V	phot	0.0015	AS/JHP
	SZ Lyn	6333.6440	134	0.21	1m	V	1001	0.0356
6333.7641							0.0352	AOA13/ARL
6615.9288		47	0.09	84	V	phot	0.0277	JHP,CVR/JHP
7044.8220		76	0.12	m2	G	ST8	0.0576	ESAOBELA15/JHP,JGT
7044.9040		76	0.12	m2	G	ST8	0.0191	ESAOBELA15/JHP,JGT
7045.7557		313	0.18	m2	G	ST8	0.0270	ESAOBELA15/DSP
7045.8719				m2	G	ST8	0.0227	ESAOBELA15/DSP
7049.8522		230	0.12	m2	G	ST8	0.0253	ESAOBELA15/CVR
7050.8158		222	0.12	m2	G	ST8	0.0247	ESAOBELA15/JGT
1 Mon		6332.7595	158	0.06	1m	V	1001	-0.0678
	6610.8688	79	0.12	84	V	phot	-0.0639	JHP,CVR/JHP
AE UMa	5901.9574	58	0.06	84	y	e2v2	0.0029	ARL,JHP/ARL
	5902.0394	58	0.06	84	y	e2v2	-0.0011	ARL,JHP/ARL
	5906.9400	118	0.17	84	V	phot	-0.0035	ARL,JHP/JHP
	5907.0230			84	V	phot	-0.0065	ARL,JHP/JHP
	5950.8077	36	0.20	1m	V	1001	-0.0045	ESAOBELA12/JHP
	5951.7986	37	0.13	1m	V	1001	0.0402	ESAOBELA12/JHP
	5989.8581	13	0.05	1m	V	1001	-0.0058	AOA12/ARL
	5990.7191	44	0.25	1m	V	1001	-0.0050	AOA12/ARL
	5990.8104			1m	V	1001	0.0003	AOA12/ARL
	6361.7207	41	0.19	1m	V	1001	0.0050	AOA13/ARL
	6361.8010	41	0.19	1m	V	1001	-0.0007	AOA13/ARL
7129.3859	16	0.07	1m	G	8300	-0.0320	AS,OTA/AS	

**Table 3: Times of minima of eclipsing binaries**

ID	HJD-2450000	$N$	$\Delta t$ (d)	Telescope	Fil	Detector	$O - C$	Observers/Reducers
W UMa	6680.77	389	0.18	m1	V	1001	0.0805	ESAOBELA14/JHP
	6680.93			m1	V	1001	-0.0931	ESAOBELA14/JHP
	6685.78	180	0.08	m1	V	1001	0.0860	ESAOBELA14/JHP
	7045.77	311	0.70	m1	V	1001	0.0811	ESAOBELA14/JHP
	7050.77	190	0.14	m1	V	1001	0.0765	ESAOBELA15/JHP

**Remarks:**

1. Telescope	2. Detector	3. Filter
1m - 1m telescope	ST8 - CCD camera ST-8	V - V-filter in UBV system
m1 - 10" Meade telescope	1001 - CCD camera ST-1001	G - Green in RGB set
m2 - 10" Meade telescope	8300 - CCD camera ST-8300	y - y-filter in <i>wby</i> system
c11 - 11" Celestron telescope	phot - <i>wby</i> Photometer	wo - Without filter
84 - 0.84m telescope	e2v2 - CCD camera e2v-4290	

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