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**236 MINIMA TIMINGS OF ECLIPSING BINARIES  
OBSERVED BY INTEGRAL OMC**

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This study uses data provided by the Optical Monitoring Camera (OMC) onboard the ESA INTEGRAL satellite (The International Gamma-Ray Astrophysics Laboratory). There are four co-aligned instruments onboard the INTEGRAL satellite: (1) gamma-ray imager IBIS (15 keV-10 MeV, field of view 9 deg), (2) gamma-ray spectrometer SPI (12 keV-8 MeV, field of view 16 deg), (3) X-ray monitor JEM-X (3-35 keV, field of view 4.8 deg), and (4) optical monitoring camera OMC (Johnson V-filter, field of view 5 deg) (Winkler et al., 2003).

While the main goal of INTEGRAL is to provide simultaneous observations of high-energy sources in all data bands, also the OMC data alone can provide important inputs for various analyses of astrophysical objects.

During the observations, OMC is pointed to the same astrophysical object as other INTEGRAL instruments. High priority INTEGRAL objects are gamma-ray bursts and other gamma-ray and X-ray sources. Optical data of the other variable objects are by-product.

But for short periodic variables, it seems to be an advantage. INTEGRAL often watch central object for a couple of days, so continuous light curves can be obtained. It allows analysing light changes of some short periodic variable stars as are eclipsing binaries.

In this study I present 236 times of minima of eclipsing binaries. OMC observations analyzed in this paper covers time span from October 2002 to October 2006. Photometric data were obtained through Johnson V filter. All times of minima were double checked.

<b>Observatory and telescope:</b>
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ESA INTEGRAL satellite (The International Gamma-Ray Astrophysics Laboratory) – 50 mm Optical Monitoring Camera (OMC)
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<b>Detector:</b>
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See technical details at (Mas-Hesse et al., 2003)
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<b>Method of data reduction:</b>
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Data processing was done by Off-line Scientific Analysis package (OSA 6.0) on Laboratory for Space Astrophysics and Theoretical Physics (LAEFF) near Madrid, Spain.
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**Method of minimum determination:**

The minima times were computed using software AVE version 2.5 based on Kwee-van Woerden method (Barberá 1996)

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
XY Ant	53327.6489	0.0007	I		2
DY Aqr	52634.1942	0.0005	I		1
FK Aql	52766.1200	0.0008			2
FK Aql	52768.772	0.001			3
V342 Aql	52966.705	0.002			2
V342 Aql	53139.625	0.003			2
V917 Aql	52739.378	0.002			3
V917 Aql	53140.677	0.002			3
V964 Aql	52962.9449	0.0007			2
V1426 Aql	52709.1130	0.0004			1
V1426 Aql	53083.420	0.007			3
CV Cam	53377.1949	0.0006	I		2
CV Cam	53394.709	0.002	I		3
CV Cam	53410.779	0.001	II		2
CV Cam	53411.755	0.001	II		3
ST Car	53152.0927	0.0005			2
ST Car	53154.7996	0.0003			2
SW Car	52824.837	0.004			3
AS Car	52824.839	0.002			2
AS Car	53145.676	0.001			3
AS Car	53148.449	0.002			3
AS Car	53159.522	0.002			3
CO Car	53148.383	0.002			2
DQ Car	53145.1508	0.0009			2
DV Car	53143.478	0.002			2
EZ Car	53161.698	0.001			2
EZ Car	53152.1924	0.0008			2
EZ Car	53167.6421	0.0008			2
GL Car	53546.900	0.002			2
ZZ Cas	53346.966	0.003	II		3
ZZ Cas	53350.094	0.005	I		3
BS Cas	53552.1143	0.0006	I		2
BS Cas	53554.979	0.001	II		3
BS Cas	53557.397	0.001	I		2
KL Cas	53349.5960	0.0005			2
V459 Cas	53559.452	0.001	II		3
V646Cas	53275.117	0.001			2
V654 Cas	53348.417	0.003			3
V785 Cas	53565.452	0.001	II		2
SS Cen	53087.976	0.001			2
SV Cen	53539.884	0.001			3
BD Cen	52835.421	0.002	II		3
MN Cen	53536.441	0.008			3

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
V379 Cen	53989.826	0.001			3
V380 Cen	53372.149	0.001			3
V676 Cen	53028.5526	0.0004	I		2
V676 Cen	53033.8140	0.0007	I		2
V676 Cen	53035.131	0.001	II		2
V677 Cen	52652.331	0.001	I		3
V677 Cen	52652.8237	0.0006	II		3
V685 Cen	53536.810	0.002			2
V685 Cen	53543.952	0.002			3
V700 Cen	52839.7889	0.0007			2
V700 Cen	52840.553	0.001			2
XX Cep	53352.315	0.002			2
BB Cep	53046.07	0.01			3
CM Cep	53355.420	0.003	I		3
CM Cep	53366.583	0.004	I		3
AT Cir	53373.029	0.004			2
BB Cir	53211.2621	0.0004			1
BD Cir	53397.04	0.01	I		3
RZ Com	53385.7292	0.0004	II		2
RZ Com	53386.0668	0.0003	II		2
EK Com	52670.0214	0.0003	I		3
EK Com	53381.9364	0.0007	II		2
EK Com	53382.4716	0.0006	II		2
EK Com	53382.5968	0.0006	I		2
EK Com	53509.8057	0.0006	I		3
EK Com	53511.8135	0.0005	II		3
EK Com	53513.8093	0.0006	I		3
EK Com	53514.6147	0.0007	I		2
EK Com	53531.4103	0.0006	I		3
EK Com	53531.8114	0.0005	II		3
EK Com	53531.9460	0.0007	I		2
EK Com	53532.3460	0.0004	II		2
AB Cru	53534.394	0.001			3
AB Cru	53537.819	0.002			2
AC Cru	53534.2800	0.0004	I		2
AC Cru	53534.7251	0.0004	II		2
AC Cru	53545.5768	0.0006	II		2
AN Cru	53549.8031	0.0008			3
AR Cru	53541.184	0.004			3
AY Cru	53525.734	0.001			2
AY Cru	53528.935	0.001			2
AY Cru	53540.1222	0.0009			2
AY Cru	53543.319	0.002			3
AY Cru	53549.720	0.002			2
UW Cyg	53207.3156	0.0007			1
WZ Cyg	53040.2806	0.0008			3
WZ Cyg	53202.7655	0.0005			2
WZ Cyg	53206.2728	0.0003			2
CV Cyg	52625.082	0.003	II		3

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
GG Cyg	52595.972	0.002			2
GG Cyg	52606.018	0.001			2
GG Cyg	52608.0257	0.0006			1
GG Cyg	52610.036	0.001			1
GG Cyg	52612.0474	0.0006			2
KR Cyg	52612.6234	0.0003	I		1
KR Cyg	52613.0512	0.0007	II		2
V388 Cyg	52613.0782	0.0007			2
V388 Cyg	52612.633	0.001			2
V442 Cyg	52613.0385	0.0004	II		1
V466 Cyg	52604.9663	0.0006	I		1
V466 Cyg	52606.3585	0.0004	I		1
V466 Cyg	52607.7506	0.0003	I		1
V466 Cyg	52609.1429	0.0004	I		1
V466 Cyg	52613.3164	0.0004	I		1
V466 Cyg	52616.0996	0.0003	I		1
V466 Cyg	52604.2725	0.0004	II		1
V466 Cyg	52607.0531	0.0004	II		1
V466 Cyg	52608.4450	0.0005	II		1
V466 Cyg	52609.8394	0.0004	II		1
V466 Cyg	52611.2290	0.0003	II		1
V466 Cyg	52614.0118	0.0002	II		1
V466 Cyg	52615.4033	0.0004	II		1
V466 Cyg	52616.7950	0.0004	II		1
V466 Cyg	52623.062	0.001	I		3
V466 Cyg	52624.4484	0.0005	I		2
V490 Cyg	52613.024	0.002	II		2
V689 Cyg	52606.371	0.001			3
V689 Cyg	52607.829	0.001			3
V689 Cyg	52609.2822	0.0008			2
V689 Cyg	52610.731	0.001			3
V689 Cyg	52612.1899	0.0008			3
V689 Cyg	52613.6452	0.0007			3
V689 Cyg	52615.104	0.008			3
V689 Cyg	52616.557	0.002			3
V809 Cyg	52606.055	0.001	I		3
V809 Cyg	52608.0198	0.0005	I		2
V809 Cyg	52609.9838	0.0004	I		2
V809 Cyg	52613.9121	0.0008	I		2
V809 Cyg	52615.8806	0.0008	I		2
V809 Cyg	52605.076	0.001	II		3
V809 Cyg	52607.0368	0.0008	II		3
V809 Cyg	52608.9952	0.0007	II		3
V809 Cyg	52610.9648	0.0008	II		3
V822 Cyg	52613.6636	0.0008			2
V822 Cyg	52616.1908	0.0009			2
V1011 Cyg	52607.071	0.001			1
V1011 Cyg	52610.308	0.004			2

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
V1011 Cyg	52613.5486	0.0003			2
V1011 Cyg	53342.442	0.004			3
V1034 Cyg	52613.0006	0.0009	I		2
SX Gem	53112.232	0.001	II		3
SX Gem	53112.927	0.002	I		2
AF Gem	53300.0698	0.0007	II		1
AF Gem	53300.688	0.003	I		1
AF Gem	53301.302	0.002	II		1
AF Gem	53301.9357	0.0003	I		1
AF Gem	53303.1783	0.0003	I		1
V829 Her	53573.9032	0.0009			3
AS Hya	53499.568	0.001			2
EZ Hya	53496.4425	0.0004			3
FO Hya	53499.4290	0.0008			1
UW LMi	53516.4313	0.0007			1
RR Nor	53211.9276	0.0005			2
TV Nor	53242.4533	0.0005	II		1
TV Nor	53408.678	0.001	I		2
GK Nor	53399.182	0.002			3
IT Nor	53227.3334	0.0007			3
IT Nor	53430.800	0.001			2
V456 Oph	53089.7944	0.0003	I		2
V456 Oph	53091.8267	0.0004	II		1
V502 Oph	53402.5929	0.0003	I		1
V502 Oph	53405.5412	0.0008	II		1
DZ Ori	52689.9811	0.0007			2
FT Ori	52939.0726	0.0004			1
V343 Ori	52690.0619	0.0004			2
GY Pup	52676.0519	0.0003	I		1
GY Pup	52676.6707	0.0002	II		1
GY Pup	52676.8749	0.0003	I		1
GY Pup	52677.0817	0.0003	II		1
GY Pup	52677.2881	0.0003	I		1
GZ Pup	52676.0137	0.0002	II		1
GZ Pup	52676.6538	0.0003	II		1
GZ Pup	52676.8149	0.0002	I		1
GZ Pup	52676.9754	0.0002	II		1
GZ Pup	52677.1347	0.0007	I		1
GZ Pup	52677.2953	0.0003	II		1
RS Sgr	53799.627	0.001			2
V457 Sco	52699.4299	0.0008	II		2
V562 Sco	53427.360	0.005			3
V569 Sco	53058.498	0.001	I		2
V569 Sco	53060.0718	0.0006	II		2
V569 Sco	53255.9086	0.0008	II		3
V569 Sco	53257.4725	0.0002	I		2
V569 Sco	53426.081	0.001	I		2
V569 Sco	53426.6035	0.0004	II		3

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
V569 Sco	53427.6495	0.0004	II		2
V569 Sco	53429.737	0.005	II		3
CQ Ser	52888.9121	0.0007			2
Y Sex	52598.988	0.001	II		2
Y Sex	52600.036	0.001	I		1
Y Sex	52600.2478	0.0008	II		1
Y Sex	52600.4547	0.0009	I		1
Y Sex	52600.665	0.002	II		2
Y Sex	52600.8759	0.0005	I		1
Y Sex	52601.0844	0.0007	II		1
Y Sex	52601.2982	0.0004	I		2
Y Sex	52602.1320	0.0006	I		1
Y Sex	52602.3443	0.0008	II		2
Y Sex	52602.9703	0.0008	I		3
Y Sex	52603.188	0.002	II		2
Y Sex	52603.3950	0.0007	I		2
Y Sex	52603.6037	0.0006	II		2
Y Sex	52603.8143	0.0004	I		1
Y Sex	52604.0249	0.0006	II		1
RZ Tau	52867.6490	0.0004	II		1
RZ Tau	52867.8557	0.0004	I		1
RZ Tau	52868.0648	0.0003	II		1
BV Tau	52679.3175	0.0005	I		1
BV Tau	52680.2469	0.0007	I		2
BV Tau	52681.176	0.001	I		1
BV Tau	52688.6214	0.0006	I		1
BV Tau	52690.478	0.004	I		3
BV Tau	52679.7755	0.0007	II		2
BV Tau	52681.6333	0.0008	II		2
HY Tau	52687.8326	0.0009			2
EG Tra	53397.6685	0.0005			1
XY Vel	53163.714	0.001			3
AH Vir	52842.2377	0.0002	II		1
AH Vir	52842.4415	0.0003	I		1
AH Vir	52842.6460	0.0003	II		1
AH Vir	52843.4607	0.0004	II		2
AH Vir	52843.6649	0.0002	I		1
AH Vir	52843.8684	0.0004	II		2
AO Vel	52805.8838	0.0007	II		2
AO Vel	52978.607	0.002	II		3
AO Vel	52981.0223	0.0008	I		2
AT Vel	52984.26	0.01			3
AW Vel	52980.581	0.001			2
AZ Vel	52819.418	0.001			2
CK Vel	53160.734	0.003			3
DL Vel	52814.8289	0.0008			1
FU Vel	53169.7491	0.0008			2
FW Vel	53163.475	0.003			3

**Remarks:**

The last column represents quality of data used to determine the time of the minimum (1 - best quality, 3 - bad quality). See for example Figures 1-3.

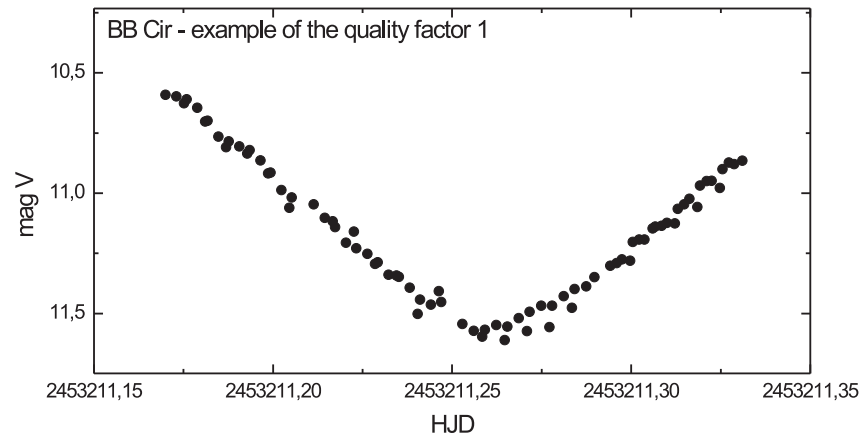


Figure 1.

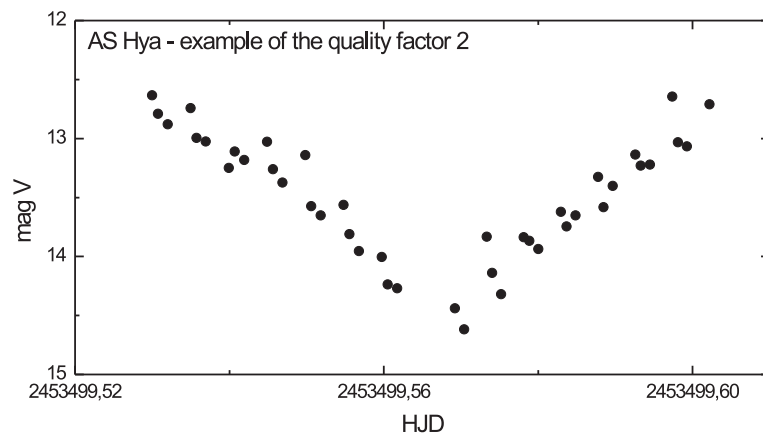


Figure 2.

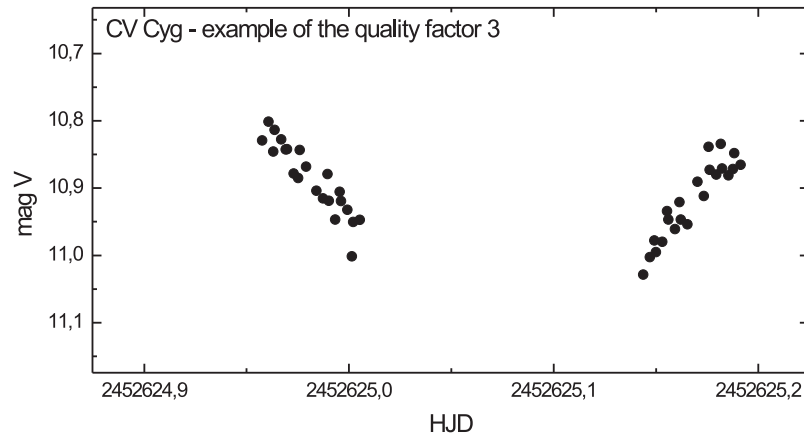


Figure 3.

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<http://heasarc.gsfc.nasa.gov/docs/integral/inthpanalysis.html>  
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