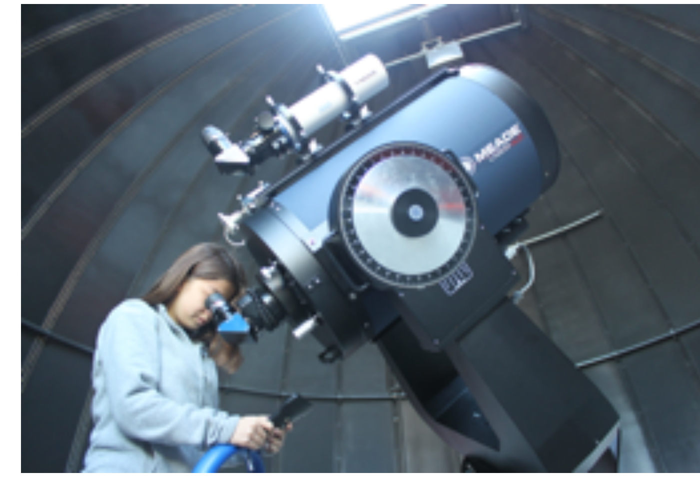
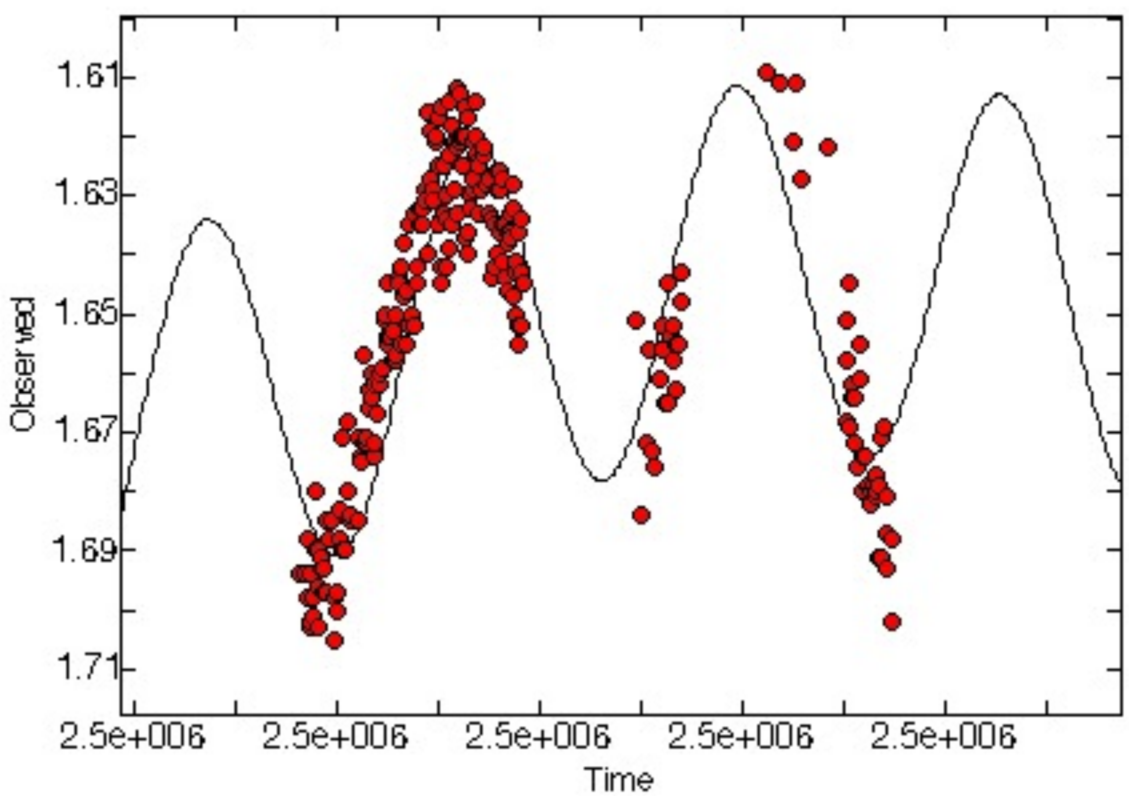
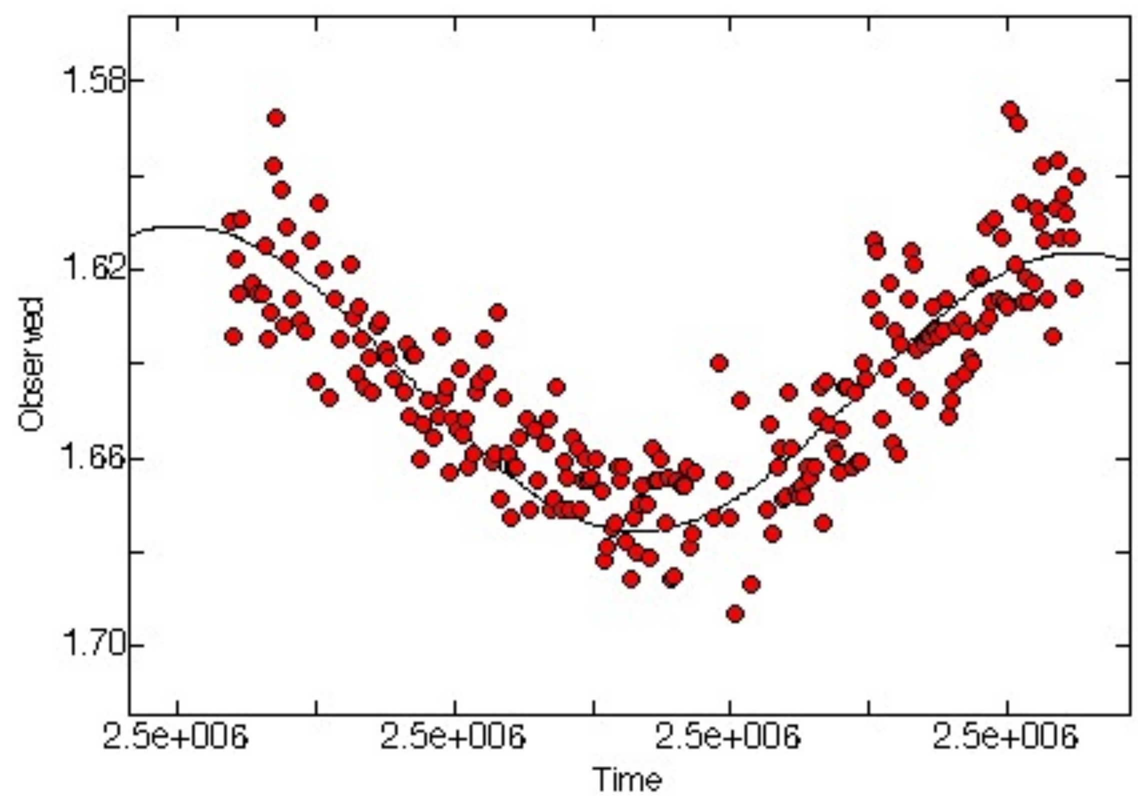
İST40 TELESKOBU
İLE
DEĞİŞEN YILDIZ GÖZLEMLERİ



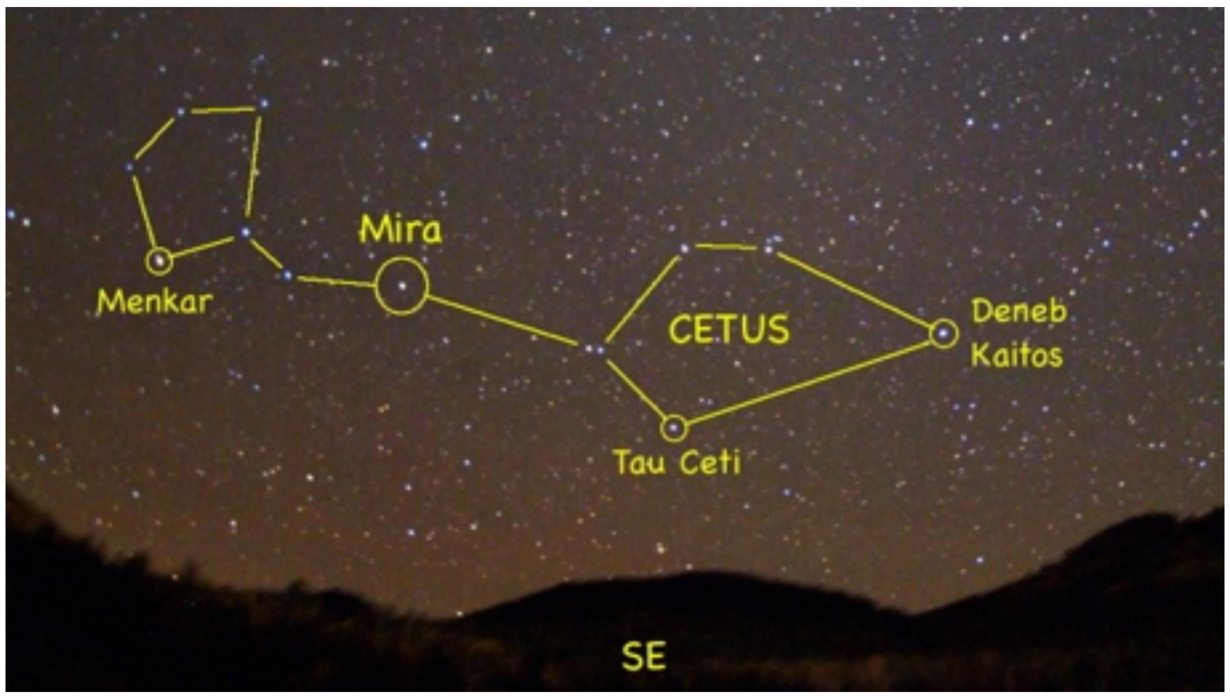
Sinan ALİŞ
salis@istanbul.edu.tr

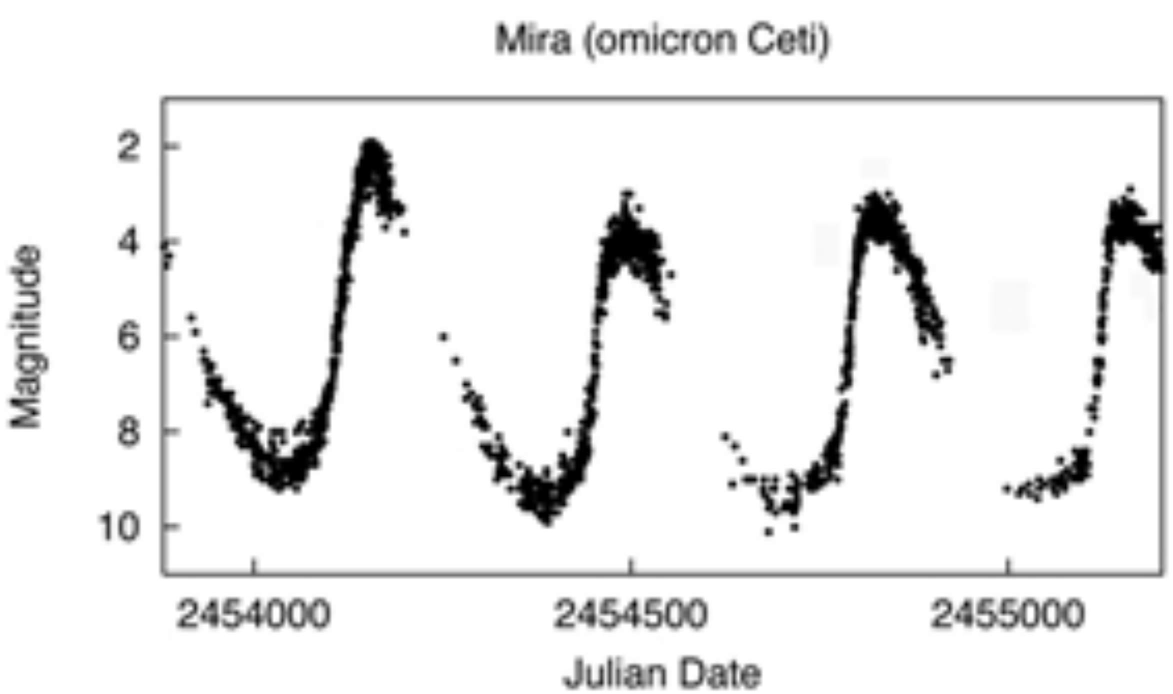


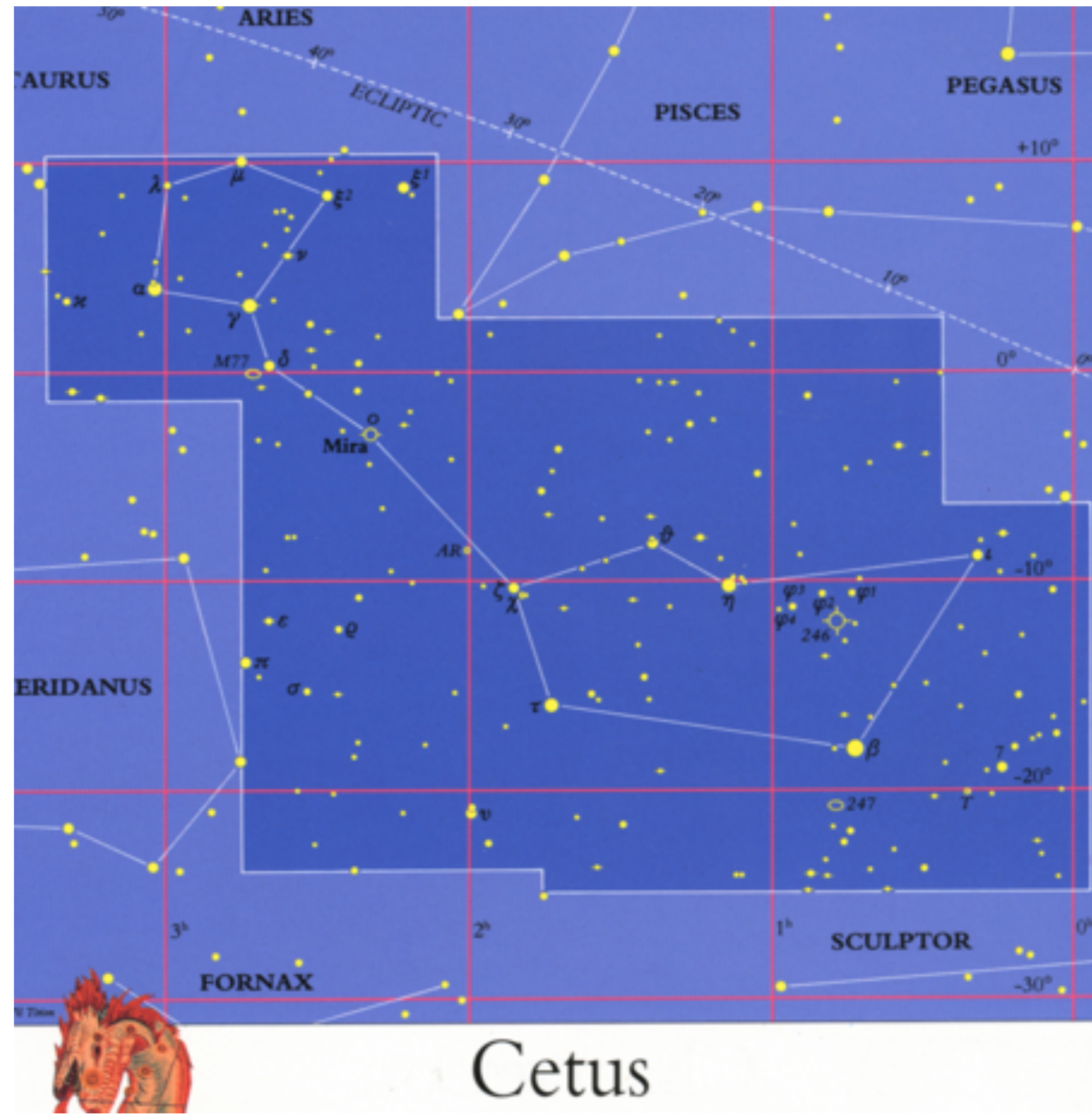


Değişen Yıldız Nedir?

Parlaklığında zamanla değişim görülen yıldızlara değişen yıldız denir.







1596 - David Fabricius / omicron Ceti - Mira

1700ler - William Herschel / alpha Her / 44i Bootis

1700ler - John Goodricke / Algol - Beta Persei

Değişen Yıldızlar Aile Ağacı

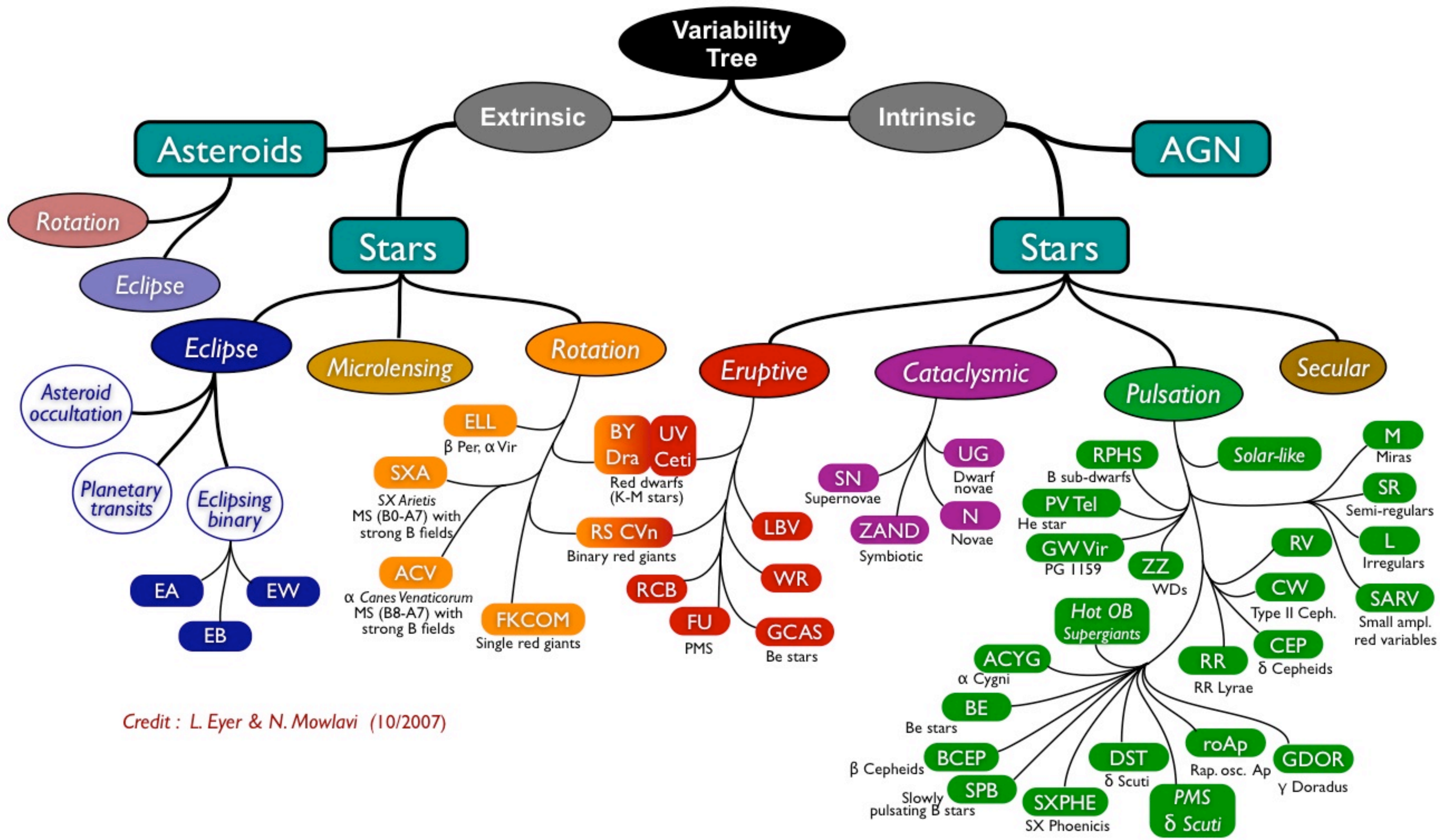


Table 1.2 Eruptive variables

Variables	GCVS			
FU Orionis	FU	T Tauri like stars		
γ Cassiopeia & Be	GCAS	Be stars		
Irregular	I	early type spectra	IA	
		mid/late type	IB	
		Orion variables	IN	INA early type spectra
				INB mid/late type
				INT T Tau stars
				IN(YY) matter accreting
		Rapid irregular	IS	ISA early type spectra
				ISB mid/late type
R Coronae Borealis	RCB	eruptions plus pulsation		
RS Canum Venaticorum	RS	close binaries with H and K Ca II in emission		
S Doradus	SDOR	very luminous stars (hypergiants)		
UV Ceti (flare stars)	UV	UV	KV–MV flaring on time scales of minutes	
		UVN	flaring Orion stars of UV type	
Wolf–Rayet	WR	broad emission features		

Table 1.4 Rotating variables

Variables	GCVS	
α^2 Canum Venaticorum	ACV &ACVO	B8p–A7p main-sequence stars
BY Draconis	BY	emission-line K–M dwarfs
Ellipsoidal	ELL	rotating ellipsoidal variables
FK Comae	FKCOM	rapidly-rotating spotted G–K giants
Pulsars	PSR	rapidly-rotating neutron stars
SX Arietis	SXARI	high-temperature analogues of α^2 CVn stars

Table 1.5 Eruptive supernovae and cataclysmic variables

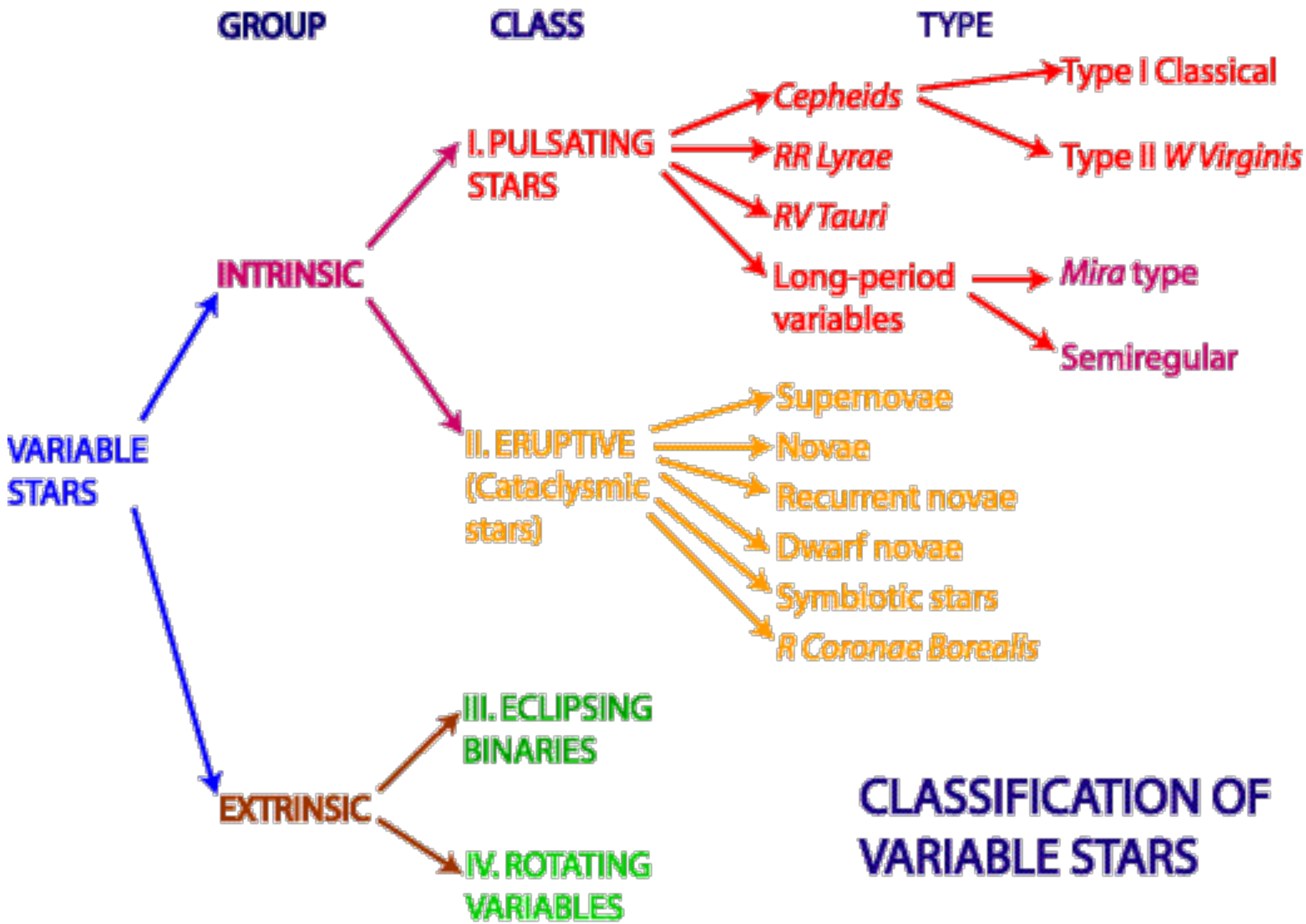
Variables	GCVS		
Novae	N	NA	Fast novae
		NB	Slow novae
		NC	Very slow novae
		NR	Recurrent novae
Novalike	NL		
Supernovae	SN	Type I Supernovae	SN I
		Type II Supernovae	SN II
U Geminorum stars (dwarf novae)	UG	UGSS	SS Cyg stars
		UGSU	SU UMa stars
		UGZ	Z Cam stars
Z Andromedae stars	ZAND	symbiotic systems	

Table 1.3 Pulsating variables

Variables	GCVS		
α Cygni	ACYG	Be–Ae pulsating supergiants	
β Cephei	BCEP	BCEP	classical β Cep stars
		BCEPS	short period β Cep stars
Cepheids	CEP	CEP	radially pulsating F Ib–II stars
		CEP(B)	double mode pulsators
W Virginis	CW	CWA	population II, Period > 8^d
		CWB	population II, Period < 8^d
Classical Cepheids	DCEP	DCEP	classical Cepheids (pop. I)
		CEP(S)	classical Cepheids (overtone)
δ Scuti	DSCT	DSCT	A0–F5III V pulsating stars
		DSCTC	low amplitude DSCT stars
Slow irregular variables	L	LB	late type giants
		LC	late type supergiants
Mira stars	M	long period late type giants	
PV Telescopii	PVTEL	helium supergiant Bp stars	
RR Lyrae	RR	RR(B)	double mode RR Lyr stars
		RRAB	RR Lyr stars with asymmetric light curves
		RRC	RR Lyr stars with symmetric light curves
RV Tauri stars	RV	RVA	radially pulsating supergiants with constant mean magnitude
		RVB	radially pulsating supergiants with variable mean magnitude
Semi-regular variables	SR	SRA	M, C, S giants with some periodicity
		SRB	M, C, S giants without periodicity
		SRC	
		SRD	
SX Phoenicis stars	SX PHE	pop II pulsating subdwarfs	
ZZ Ceti stars	ZZ	ZZA	hydrogen pulsating white dwarfs
		ZZB	helium pulsating white dwarfs

Table 1.6 Eclipsing variables

Variables	GCVS		
Classification *a*			
	E	EA	Algol types
		EB	β Lyr types
		EW	WUMa types
Classification *b*			
		GS	one or two giant components
		PN	one component is the nucleus of a planetary nebula
		RS	RS CVn system
		WD	systems with a white dwarf component
		WR	systems with a WR component
Classification *c*			
	AR		AR Lac type detached system
	D	DM	Detached main sequence systems
		DS	Detached systems with subgiant
		DW	Detached systems like WUMa systems
	K	KE	contact systems of early spectral type
		KW	contact systems of late spectral type
	SD		semi-detached systems


GROUP
CLASS
TYPE
VARIABLE STARS
INTRINSIC
EXTRINSIC
I. PULSATING STARS
II. ERUPTIVE (Cataclysmic stars)
III. ECLIPSING BINARIES
IV. ROTATING VARIABLES
Cepheids
RR Lyrae
RV Tauri
Long-period variables
Type I Classical
Type II W Virginis
Mira type
Semiregular
Supernovae
Novae
Recurrent novae
Dwarf novae
Symbiotic stars
R Coronae Borealis
CLASSIFICATION OF VARIABLE STARS

Dönen Değişen Yıldızlar

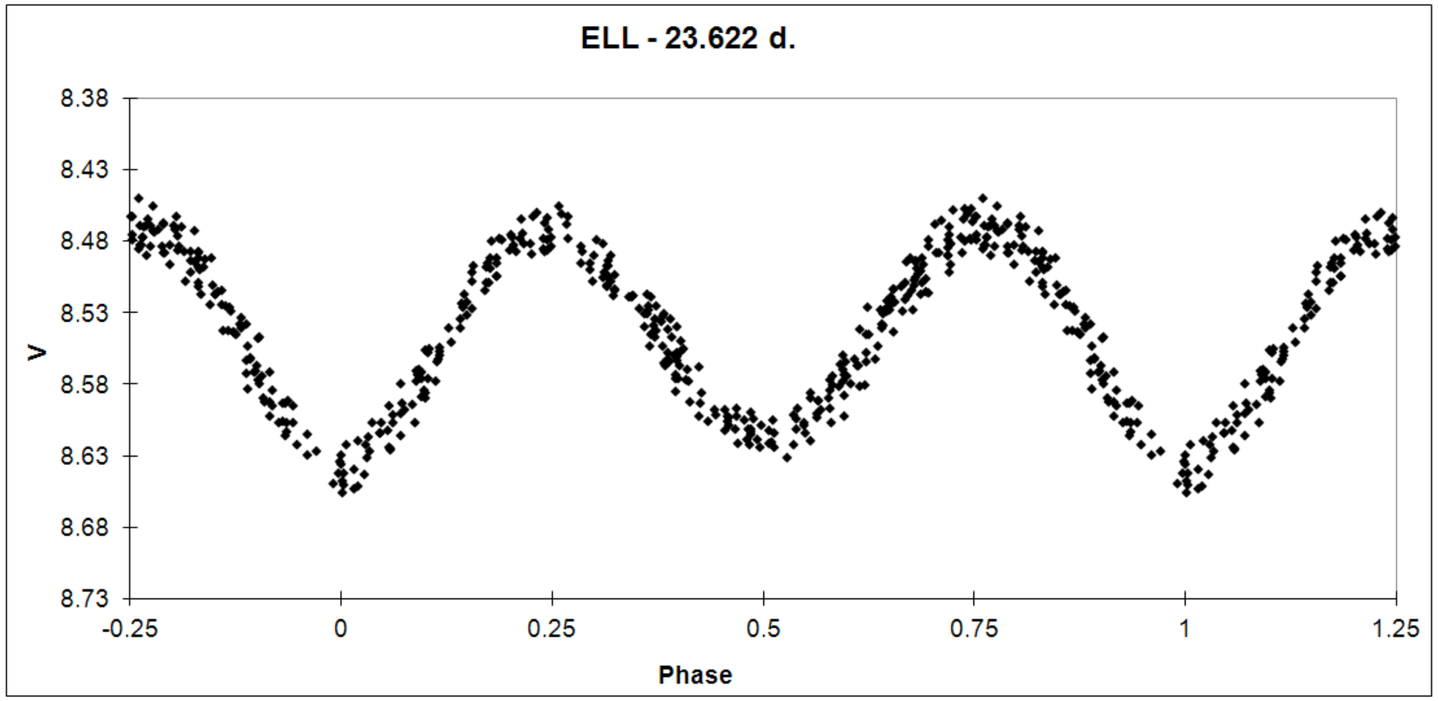
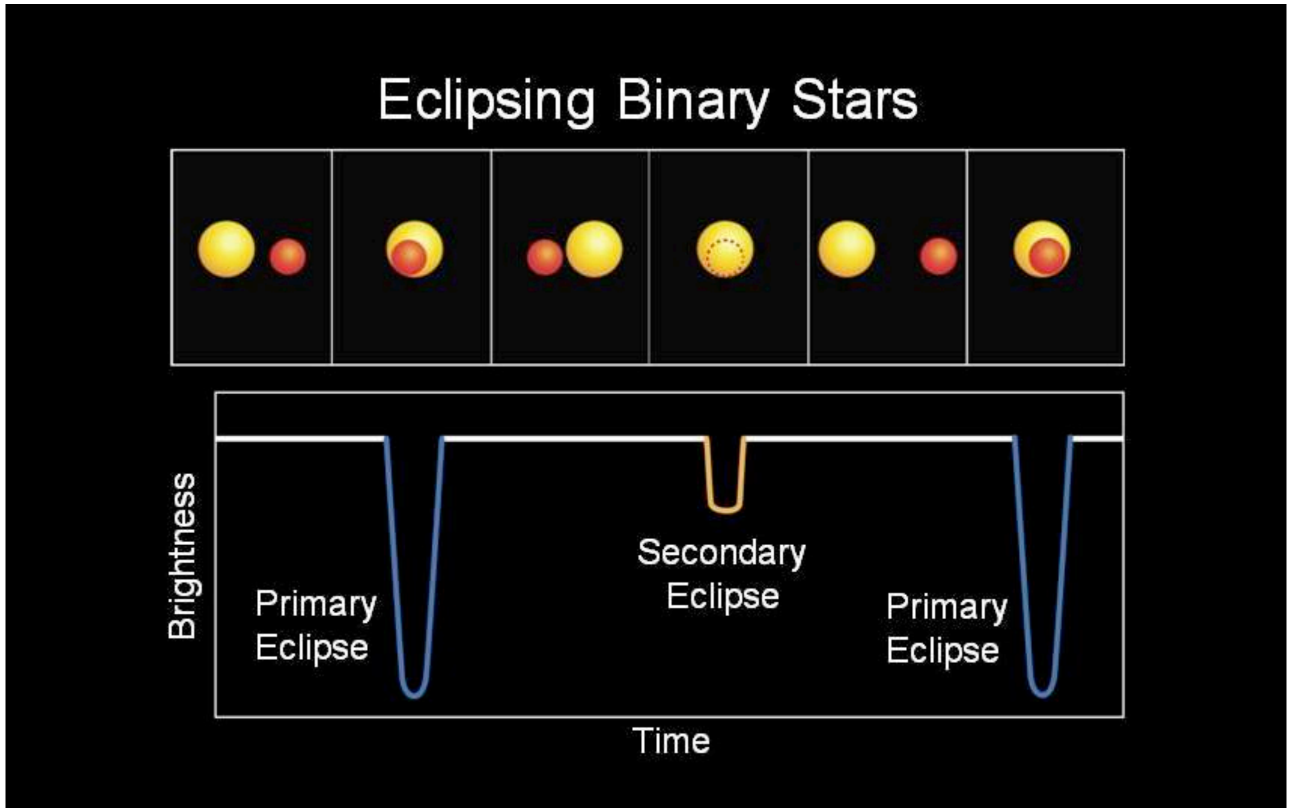
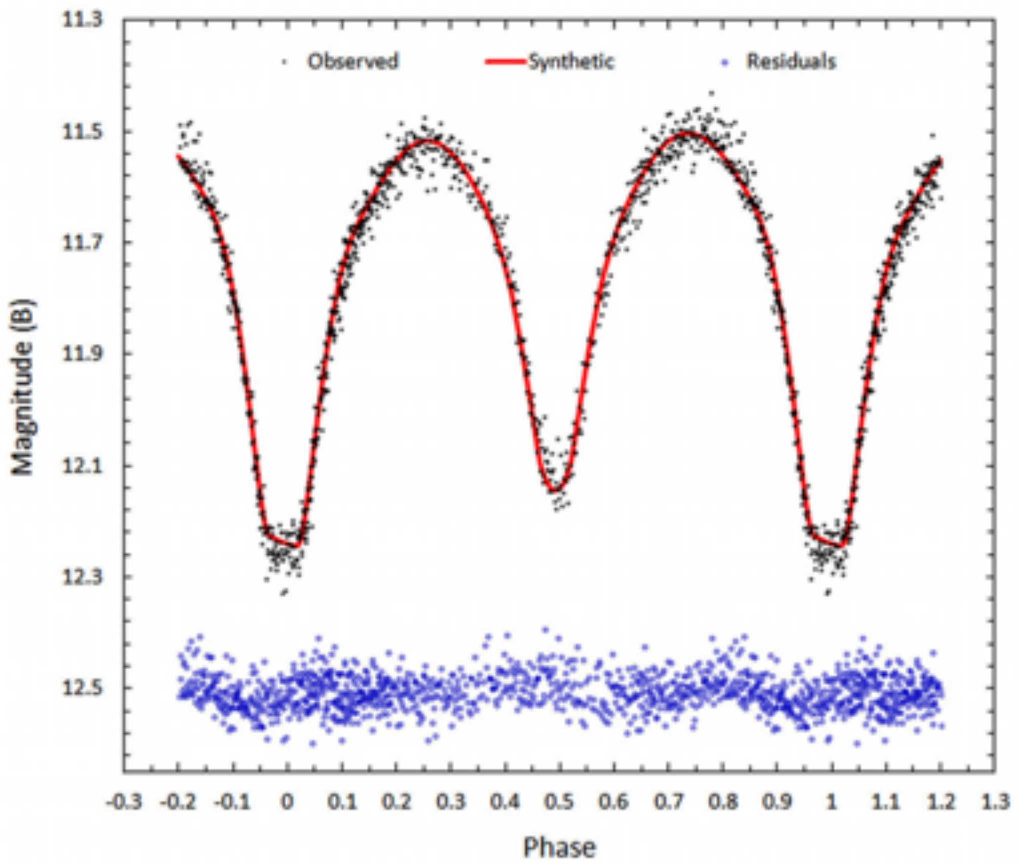


Table 5.2. *Bright and/or interesting ellipsoidal variables*

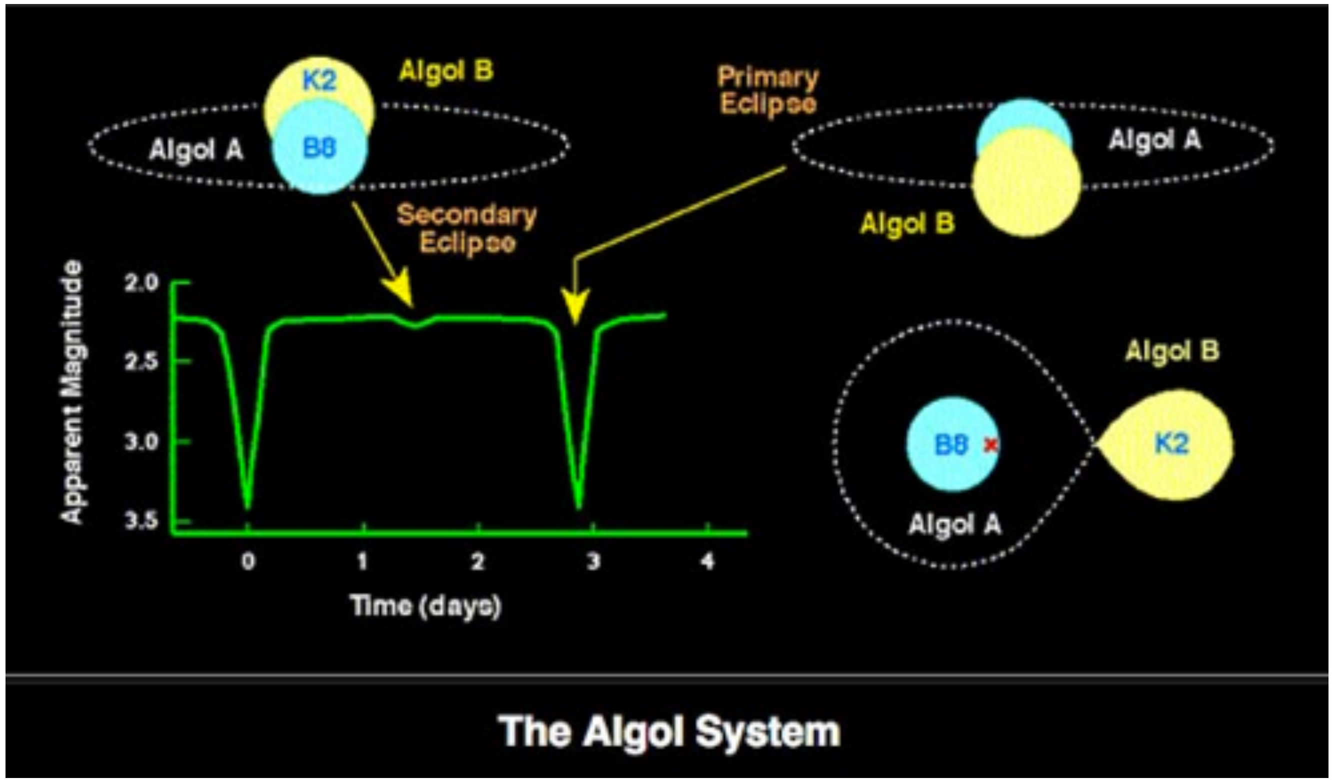
Name	Period (d)	ΔV	Spectrum	V
ψ Ori	2.526	0.03	B0+B0	4.58
α Vir	4.014	0.10	B2V+B3Vi	0.96
π^5 Ori	3.700	0.05	B3+?	3.72
o Per	4.419	0.03	B1III+B	3.82
b Per	1.527	0.06	A2+?	4.54
V1357 Cyg	5.599824	0.21	O9.7Iab + black hole	8.95

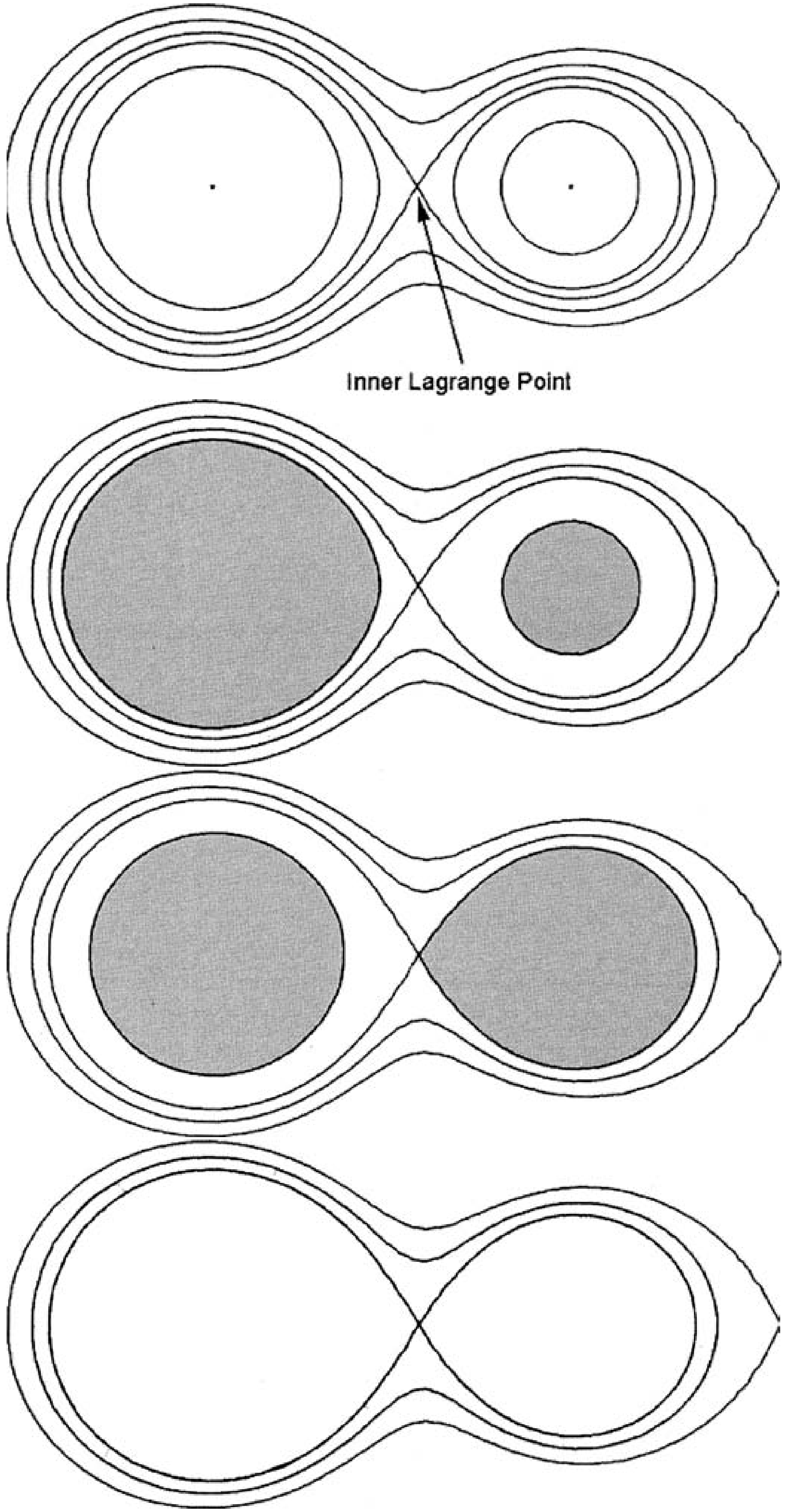
Örten Çift Yıldızlar

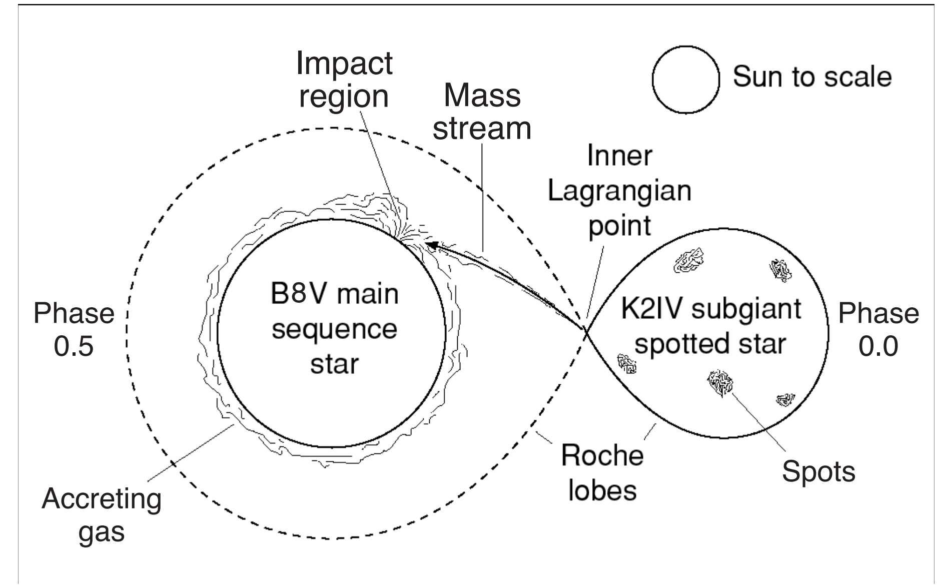


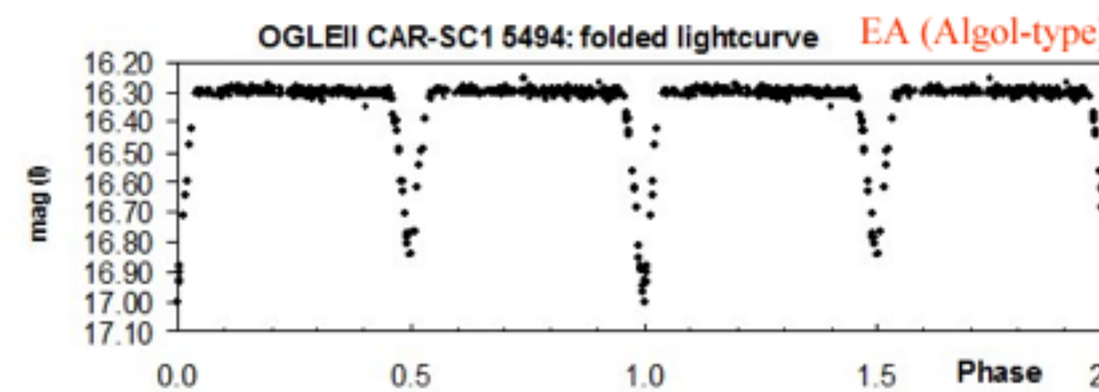


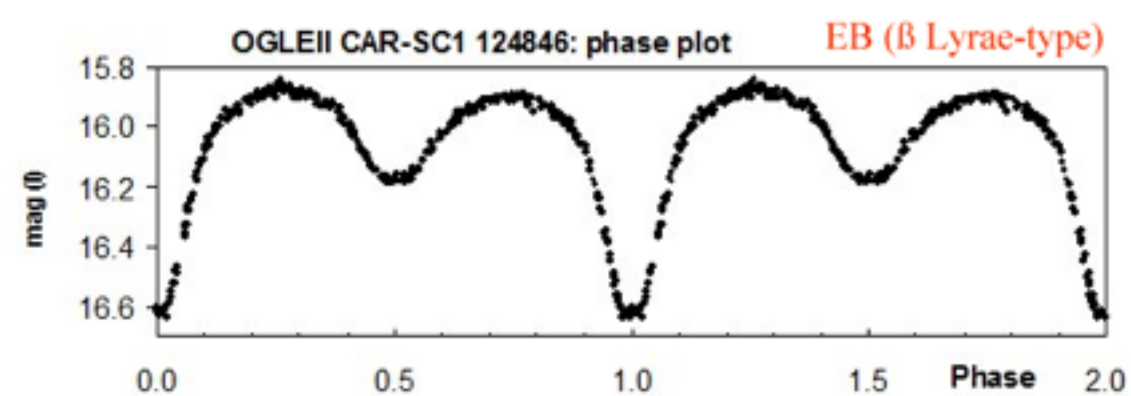
http://astro.unl.edu/naap/ebs/animations/ebs.html

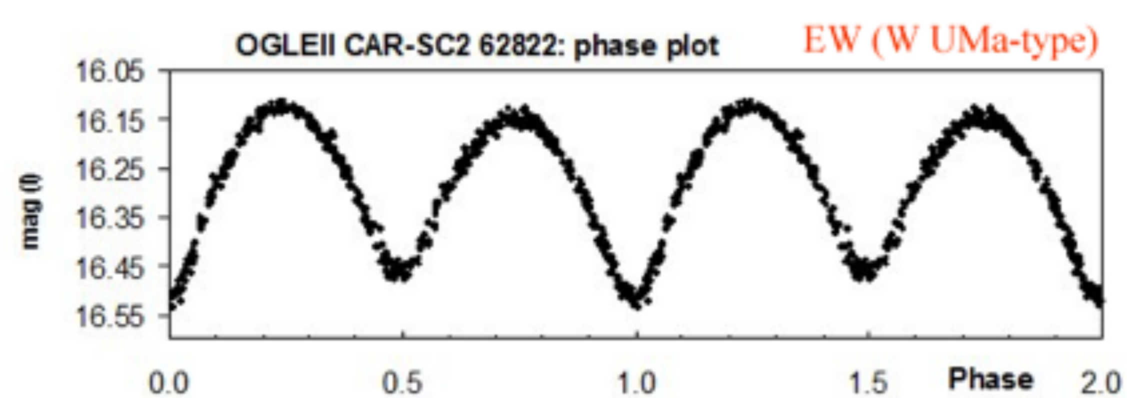



Inner Lagrange Point

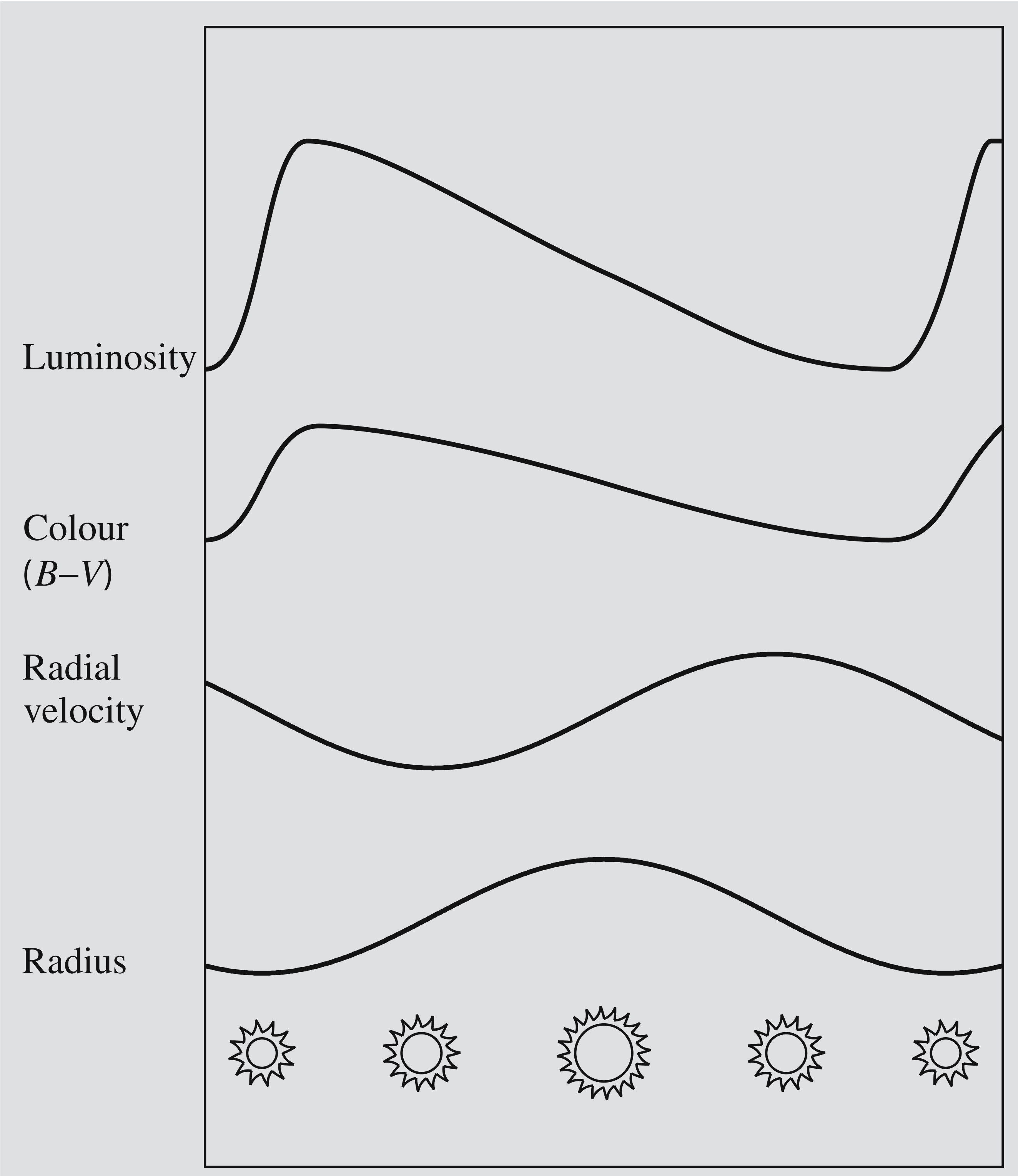

Impact region
Mass stream
Sun to scale
Inner Lagrangian point
Phase 0.5
B8V main sequence star
K2IV subgiant spotted star
Phase 0.0
Accreting gas
Roche lobes
Spots


OGLEII CAR-SC1 5494: folded lightcurve
EA (Algol-type)
mag (I)
16.20
16.30
16.40
16.50
16.60
16.70
16.80
16.90
17.00
17.10
0.0
0.5
1.0
1.5
Phase
2.0

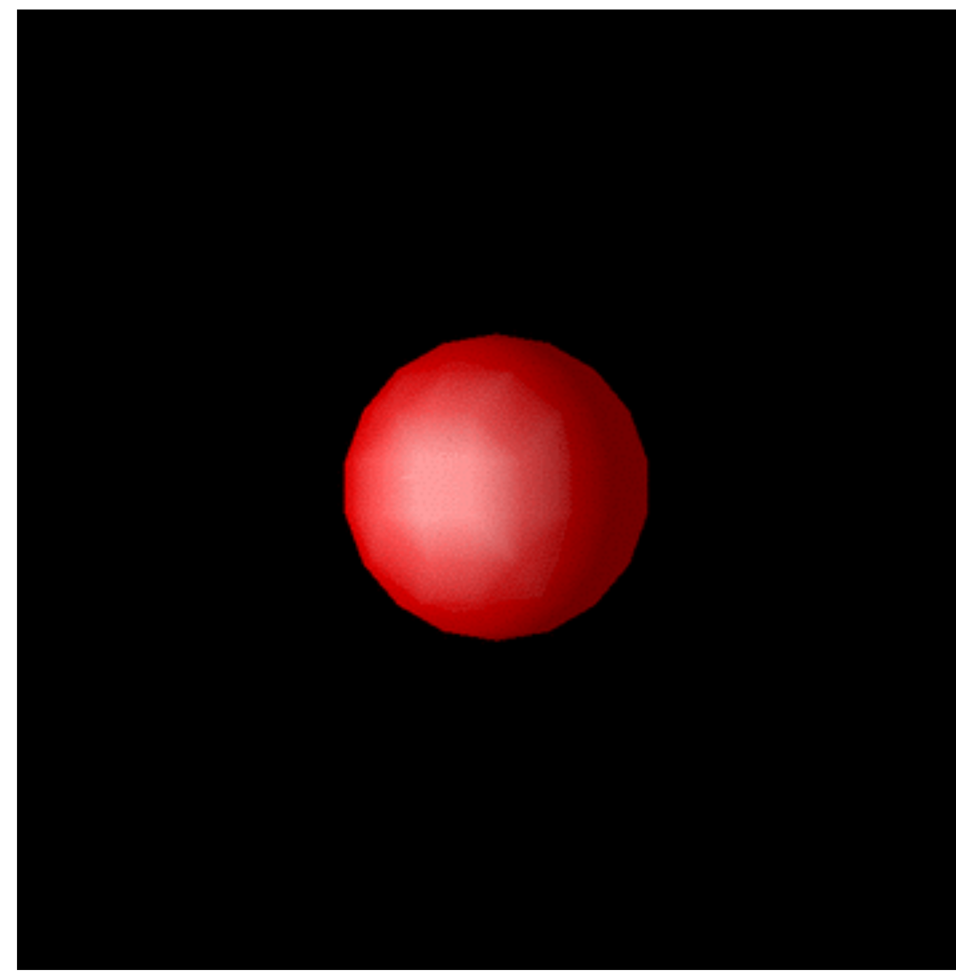

OGLEII CAR-SC1 124846: phase plot
EB (ß Lyrae-type)
mag (I)
15.8
16.0
16.2
16.4
16.6
0.0
0.5
1.0
1.5
Phase
2.0

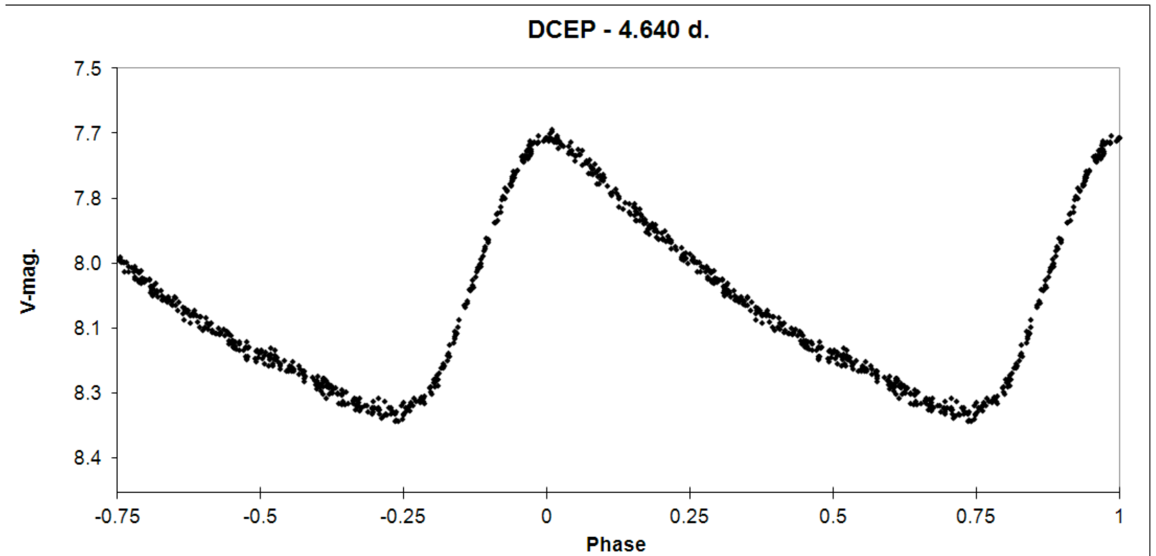

OGLEII CAR-SC2 62822: phase plot
EW (W UMa-type)
mag (I)
16.05
16.15
16.25
16.35
16.45
16.55
0.0
0.5
1.0
1.5
Phase
2.0

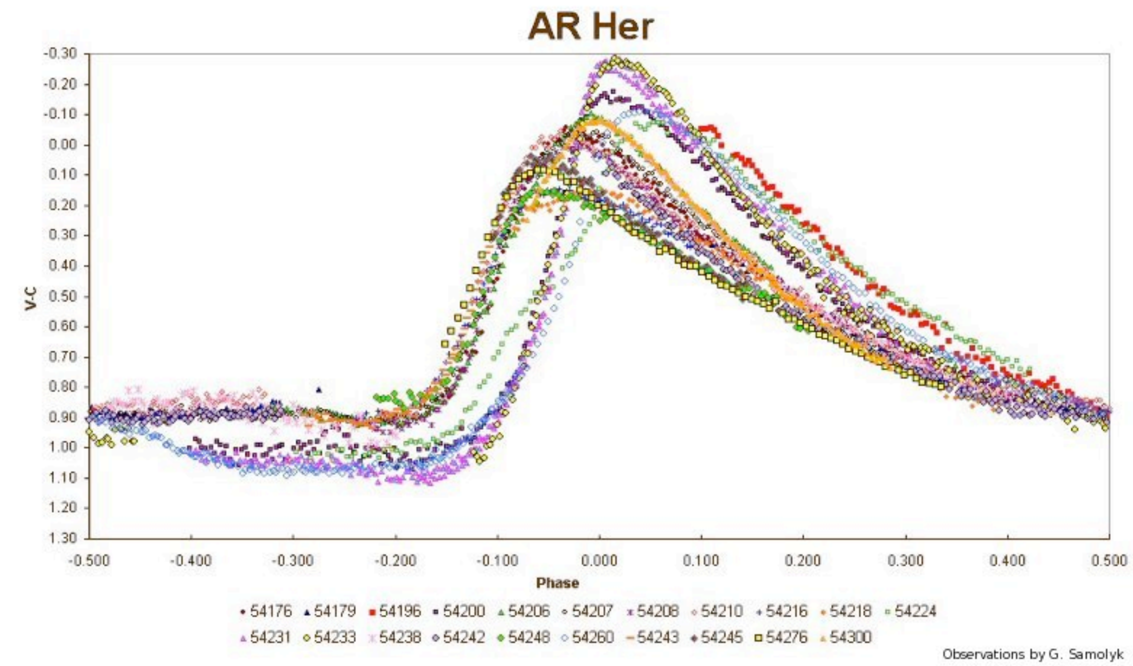
Zonklayan Yıldızlar

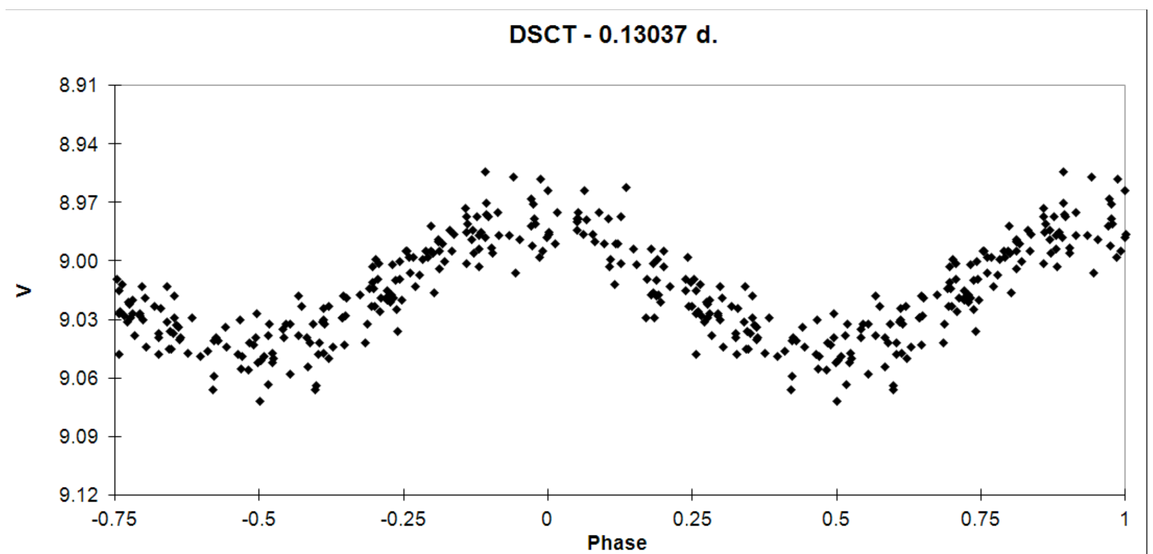


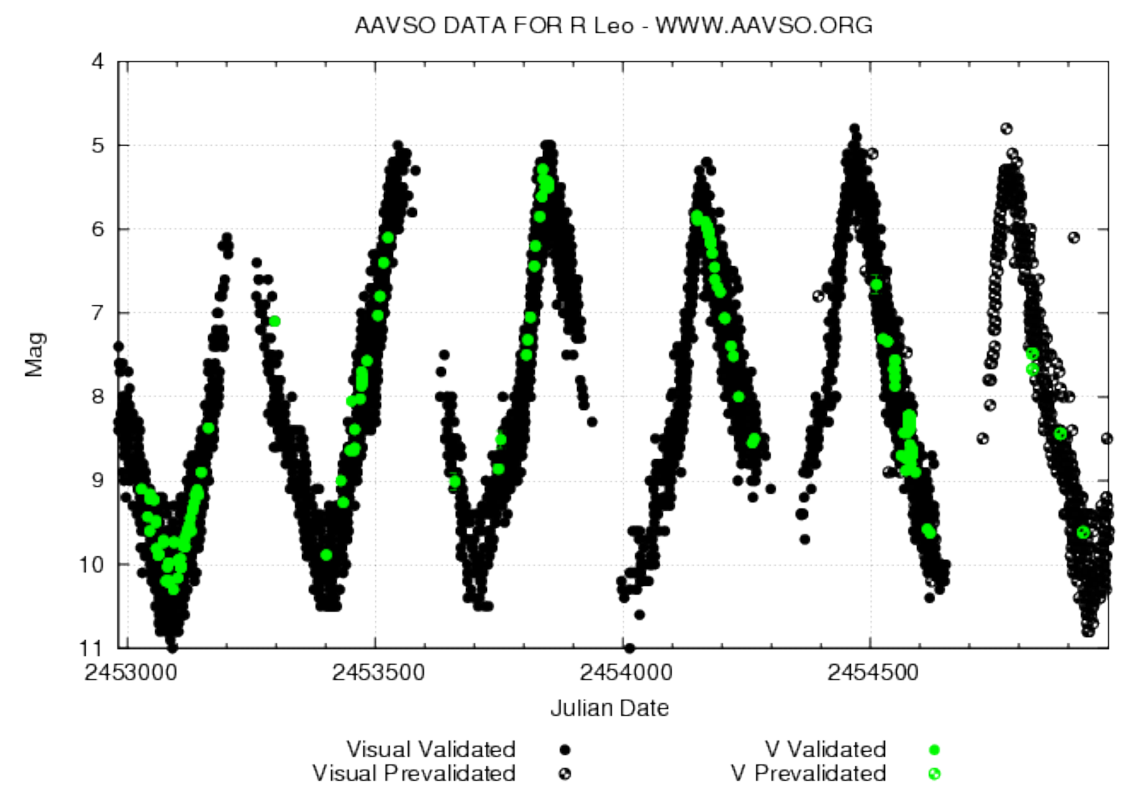
Variable	N	P	Spectrum	Δm
Classical cepheids (δ Cep, W Vir)	800	1–135	F–K I	$\lesssim 2$
RR Lyrae	6100	< 1	A–F8	$\lesssim 2$
Dwarf cepheids (δ Scuti)	200	0.05–7	A–F	$\lesssim 1$
β Cephei	90	0.1–0.6	B1–B3 III	$\gtrsim 0.3$
Mira variables	5800	80–1000	M–C	$\gtrsim 2.5$
RV Tauri	120	30–150	G–M	$\lesssim 4$
Semiregular	3400	30–1000	K–C	$\lesssim 4.5$
Irregular	2300	–	K–M	$\lesssim 2$

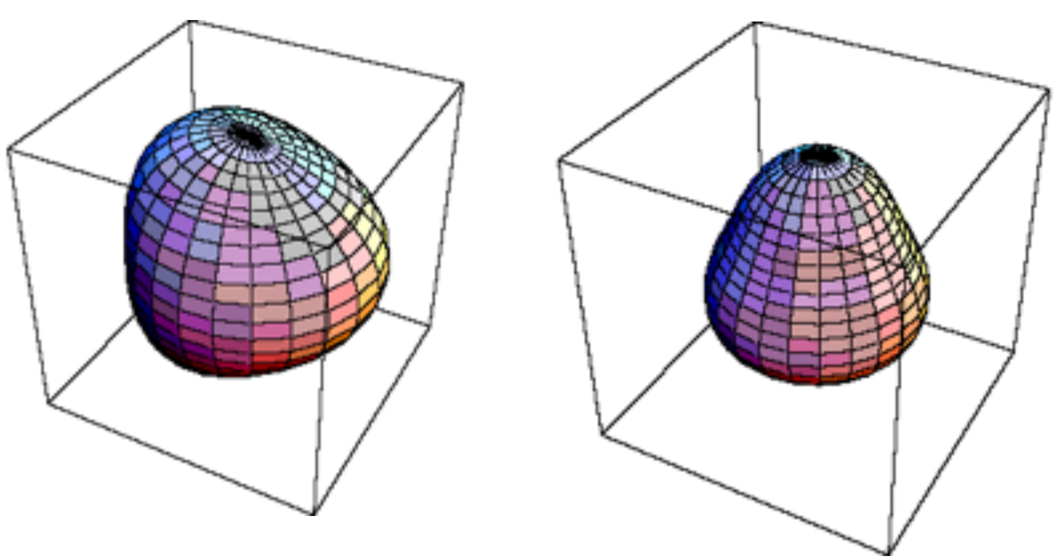



DCEP - 4.640 d.
V-mag.
Phase


AR Her
V-C
Phase
54176 54179 54196 54200 54206 54207 54208 54210 54216 54218 54224
54231 54233 54238 54242 54248 54260 54243 54245 54276 54300
Observations by G. Samolyk


DSCT - 0.13037 d.
V
Phase


AAVSO DATA FOR R Leo - WWW.AAVSO.ORG
Mag
Julian Date
Visual Validated
Visual Prevalidated
V Validated
V Prevalidated



Hertzsprung-Russell Diagramı

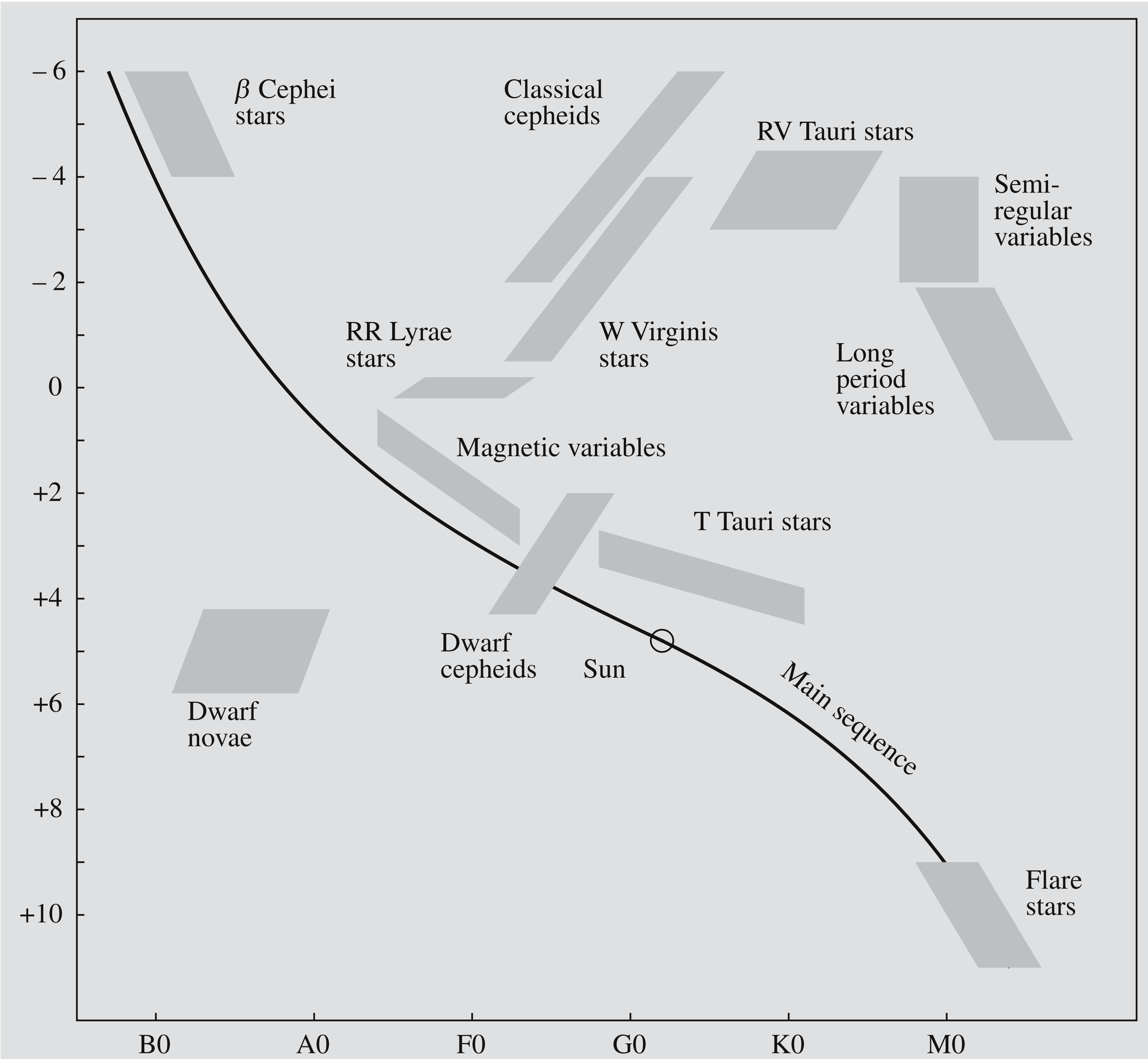
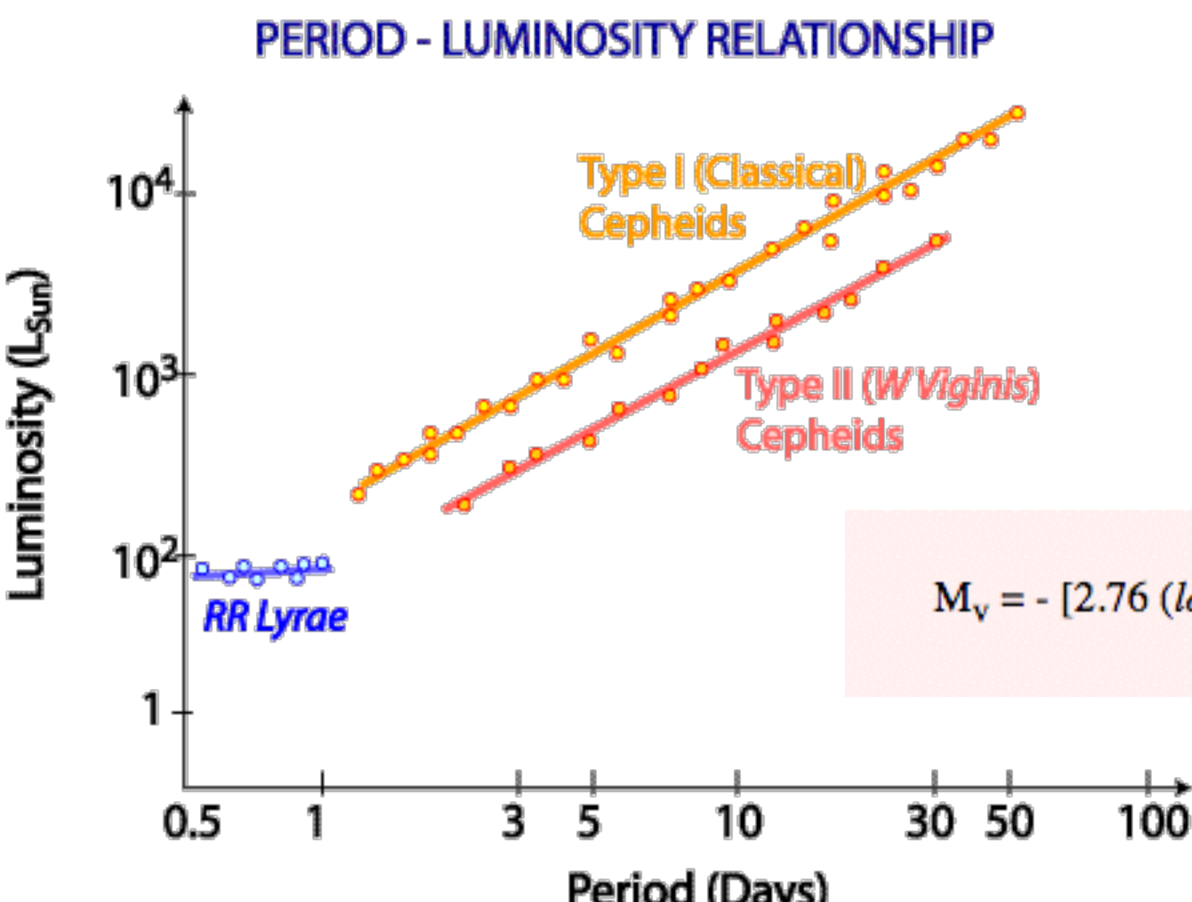
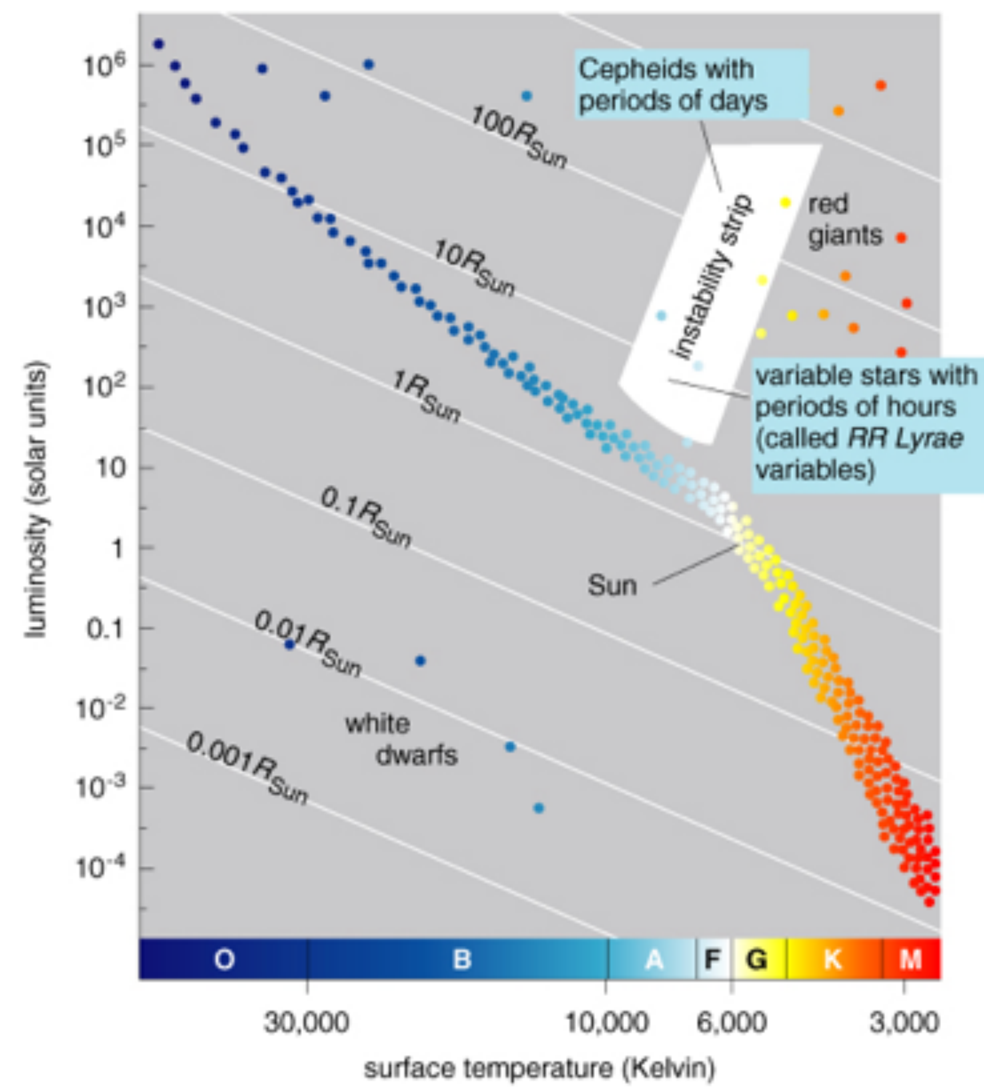


Figure 1: Large Magellanic Cloud
Image by David Malin

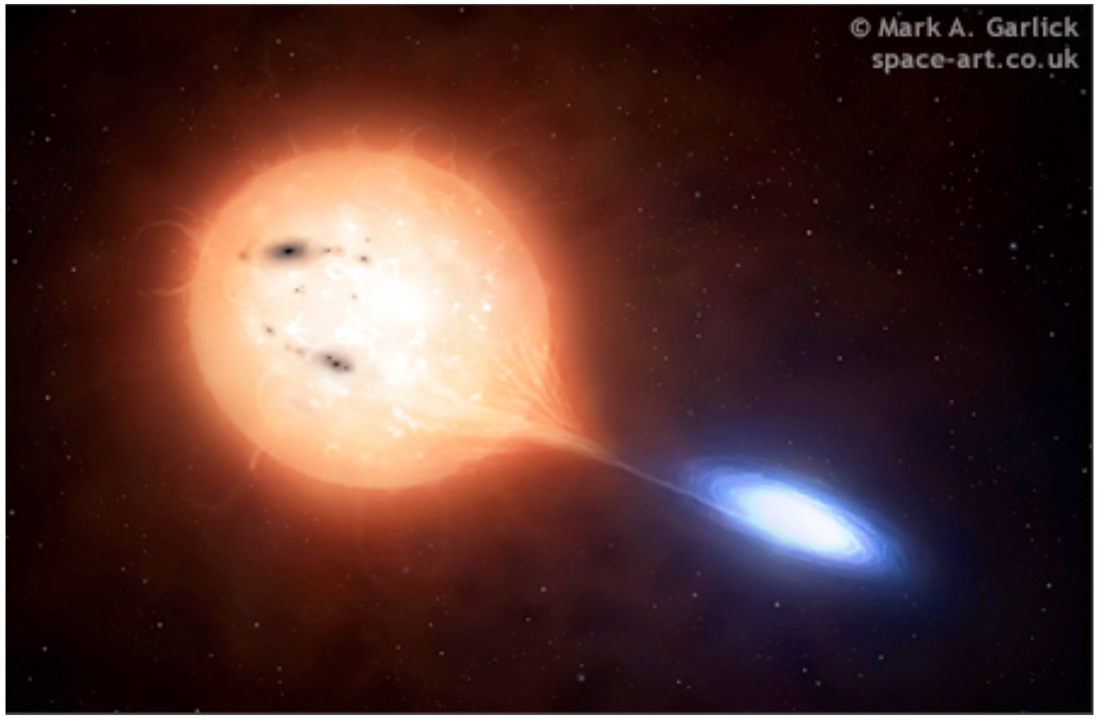
Figu

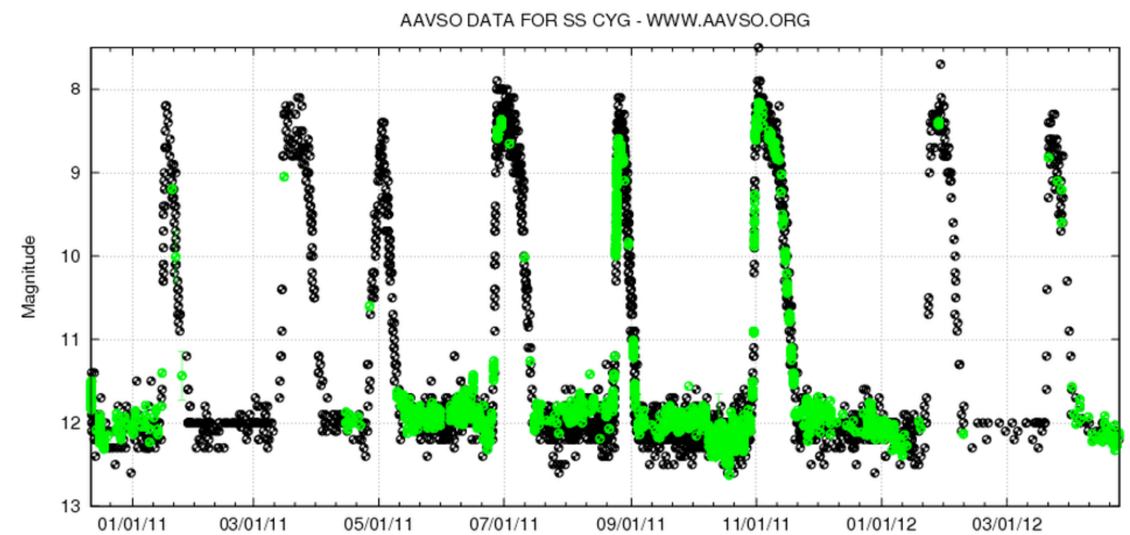


$$M_v = - [2.76\ (log_{10}(P) - 1.0)] - 4.16,$$

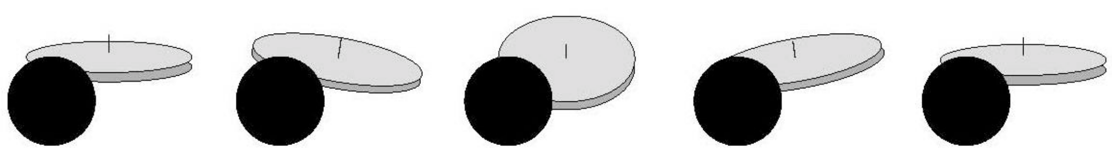


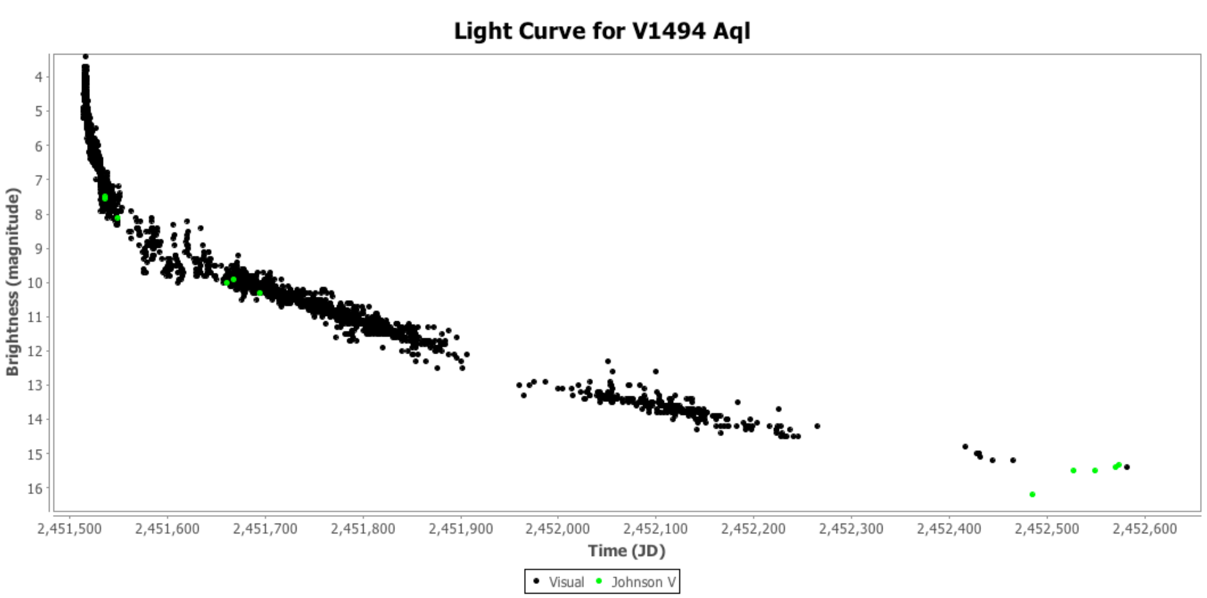
Kataklismik Değişenler





500 day light curve of SS Cygni. Note the two distinct types of outbursts.

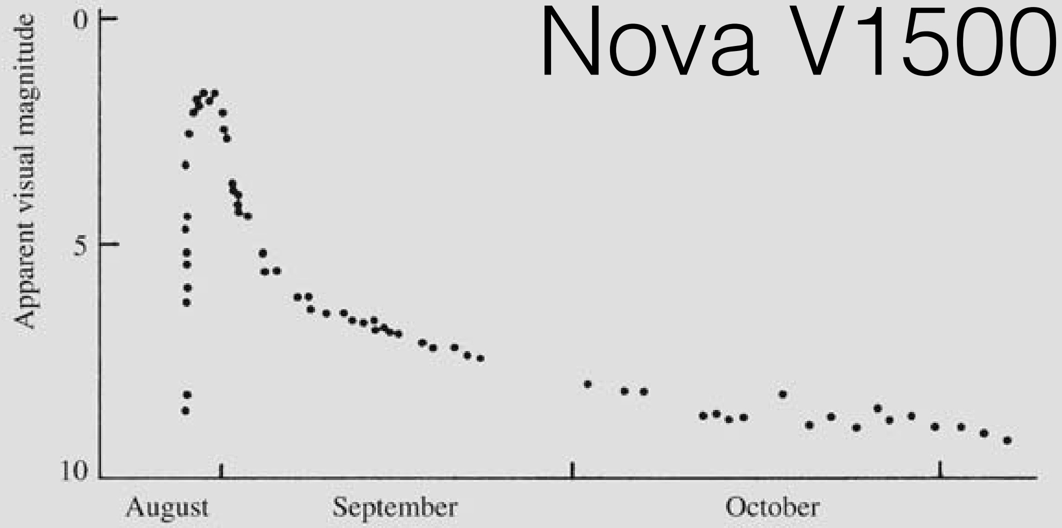


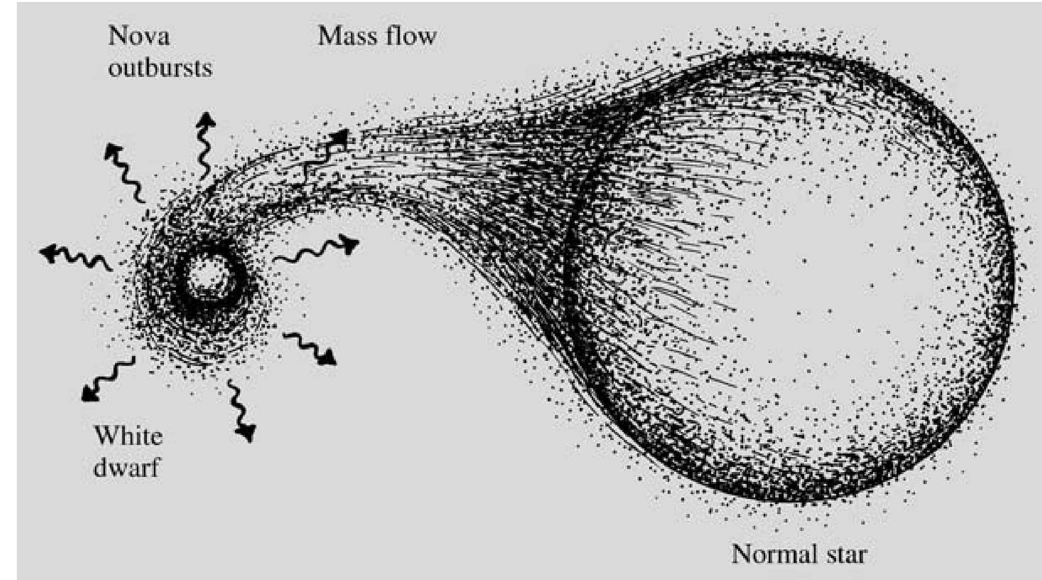


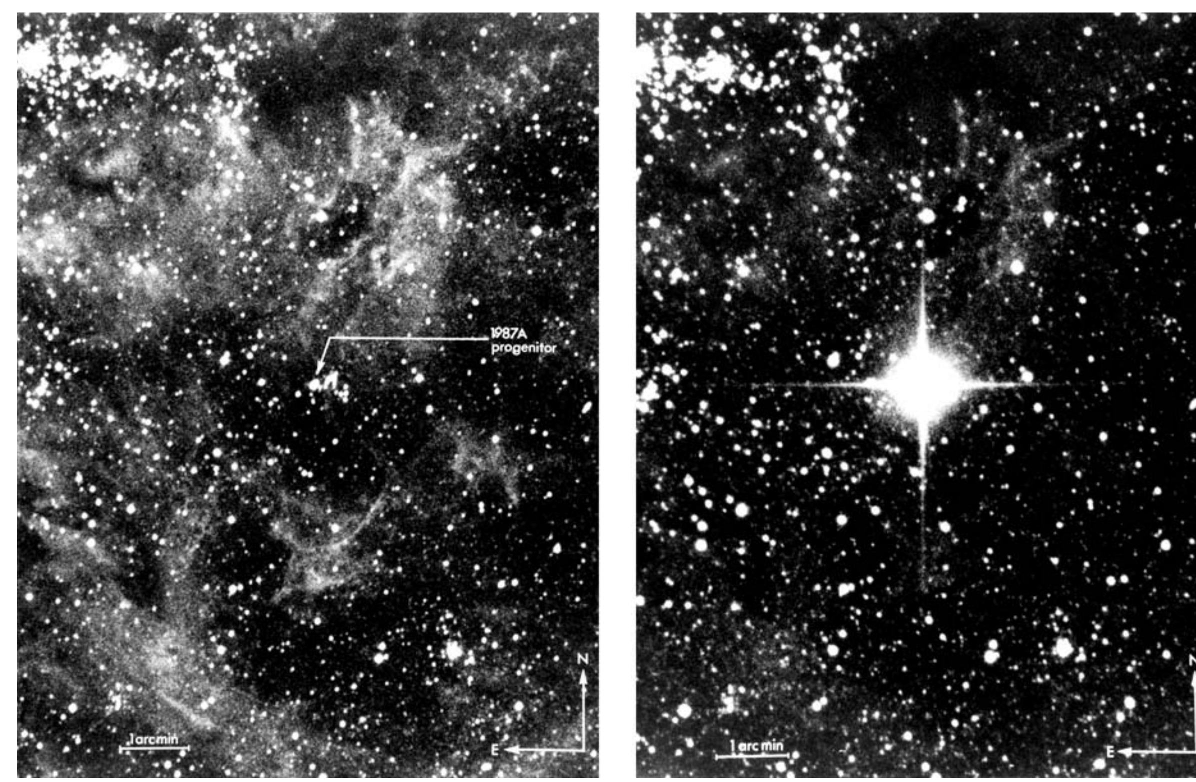
Tablo 1.1 : Kataklismik değişenlerin sınıflandırılması. Çizelgenin ilk sütununda sınıflar büyük harflerle, bu sınıflara ait olan alt sınıflar küçük harflerle ve italik olarak yazılmıştır. İkinci sütun patlama genliğini, üçüncü sütun bir patlama sırasında açığa çıkan enerjiyi, dördüncü sütun ise patlamaların tekrarlama dönemlerini göstermektedir (Ak, 1999).

SINIF	GENLİK (^{m})	ENERJİ ÇIKIŞI (erg)	TEKRARLAMA DÖNEMİ
NOVA	8 – 18	10^{44} - 10^{45}	Tekrarlama yok
TEKRARLAYAN NOVA	7 – 9	10^{43} - 10^{44}	10 - 100 + yıl
CÜCE NOVA			
U Gem	2 – 6	10^{38} - 10^{39}	30 - 500 + gün
SU UMa	2 – 6	10^{38} - 10^{39}	10 - 30 + gün
Z Cam	2 – 6	10^{38} - 10^{39}	10 - 50 + gün
NOVA BENZERİ YILDIZ			
UX UMa	-----	-----	-----
Anti-Cüce	2 – 5	-----	sönükleşme
DQ Her	-----	-----	-----
AM Her	2 – 5	-----	sönükleşme
AM CVn	-----	-----	-----

Nova V1500 Cyg







SN 1987A

Yıldızların Adlandırılması

α	Alpha	ι	Iota	ρ	Rho
β	Beta	κ	Kappa	σ	Sigma
γ	Gamma	λ	Lambda	τ	Tau
δ	Delta	μ	Mu	υ	Upsilon
ε	Epsilon	ν	Nu	ϕ	Phi
ζ	Zeta	ξ	Xi	χ	Chi
η	Eta	ο	Omicron	ψ	Psi
θ	Theta	π	Pi	ω	Omega

Name	Bayer	Hipparchus	Flamsteed
Antares	α Sco	HIP 80763	
Betelgeuse	α Ori	HIP 27989	
Merak	β UMa	HIP 53910	
	-	HIP 107232	44 Cap
Saiph	κ Ori	HIP 27366	
Sirius	α CMa	HIP 32349	

Star	Bayer Designation	Apparent Magnitude
Sirius	Alpha Canis Majoris	-1.46
Vega	Alpha Lyrae	0.03
Rigel	Beta Orionis	0.12
Betelgeuse	Alpha Orionis	0.7
Antares	Alpha Scorpii	0.96
Polaris	Alpha Ursae Minoris	2.02

Değişen Yıldızların Adlandırılması

- Bayer adlandırması olan yıldızlar adlandırılmaz
- **Adlandırmaya R'den başlanır** ve Z'ye kadar devam edilir.
- Z'den sonra, RR'den RZ'ye sonra SS'den SZ'ye, TT'den TZ'ye ve en son ZZ'ye kadar devam edilir.
- ZZ'den sonra, AA'dan AZ'ye, BB'den BZ'ye, CC'den CZ'ye ve en son QZ'ye kadar adlandırma yapılır. **J harfi hiç kullanılmaz**.
- Bu şekilde yapılan adlandırmada BA, CA, CB, DA veya benzeri adlandırma üretilmez.
- **Bu şekilde toplam 334 değişen yıldız adlandırılabilir.**
- Sonrasında V335, V336, V337 diye devam edilir.

Ör: GQ Dra, V357 Peg, W UMa, 44 Bootis, AB And, RZ Cas, V401 Aur

Soru: *Bir takımyıldızda en çok kaç değişen olabilir? Hangi takımyıldızlar?*

Değişen Yıldız Listeleri / Katalogları

Bir yıldızın değişen olup olmadığını nereden öğrenebiliriz?

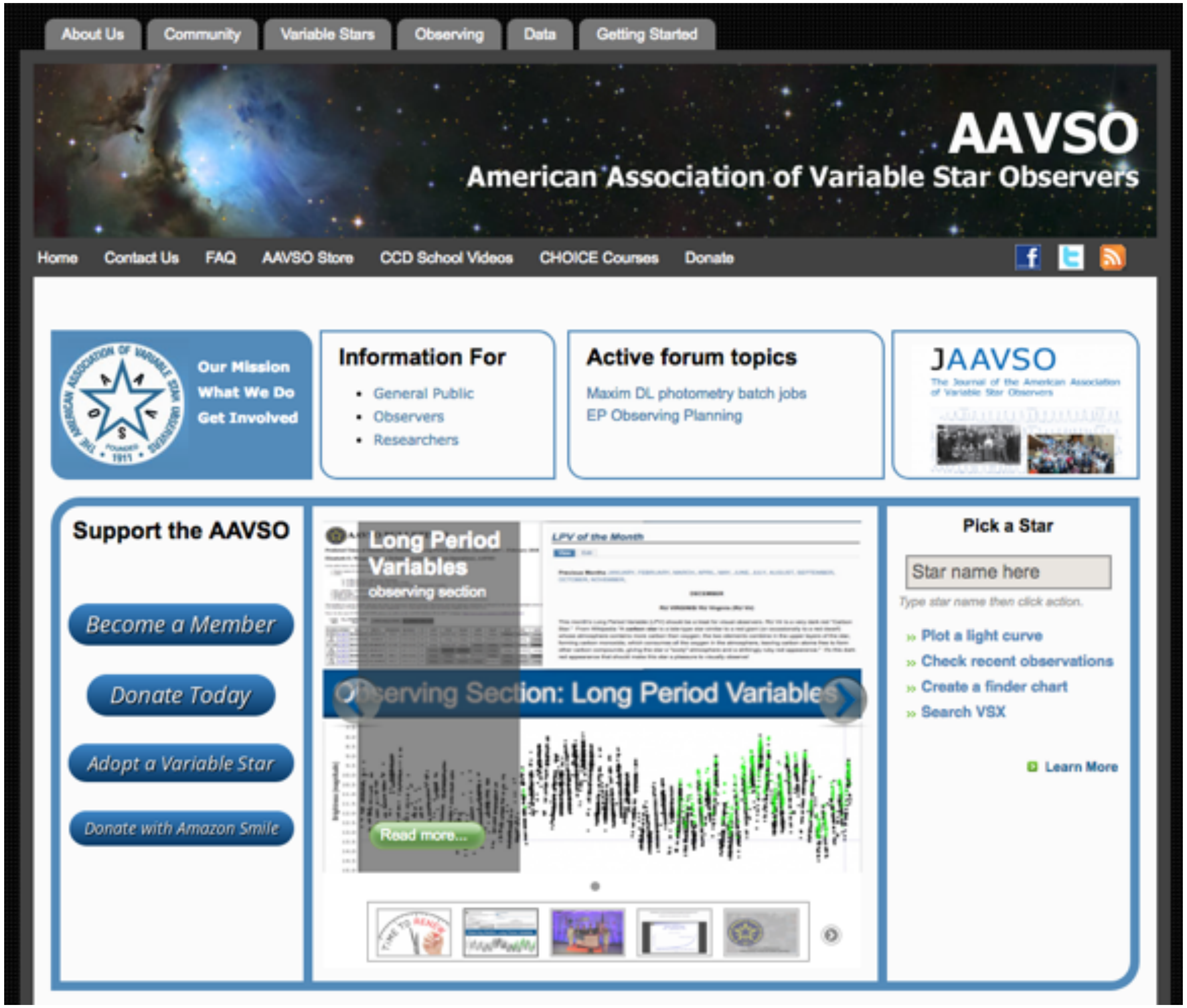
SIMBAD
http://simbad.u-strasbg.fr

GCVS
General Catalogue of Variables Stars
http://www.sai.msu.su/gcvs/gcvs/

IBVS
Information Bulletin on Variable Stars
http://www.konkoly.hu/IBVS/

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Amerikan Değişen Yıldız Gözlemcileri Birliği



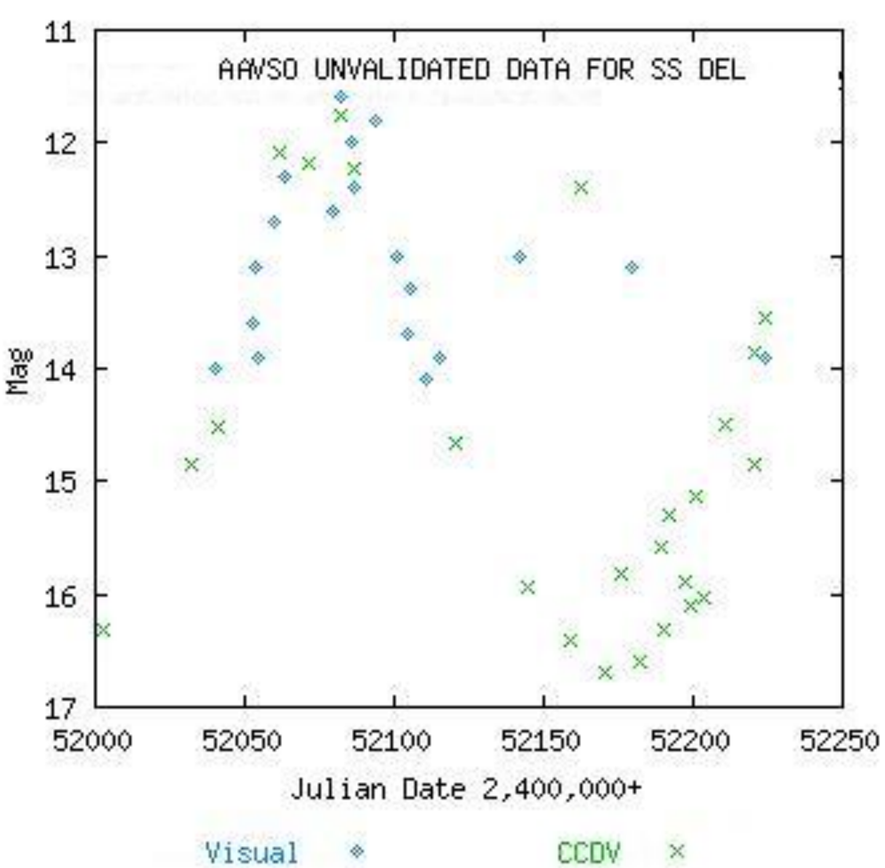
THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
AAVSO
FOUNDED 1911

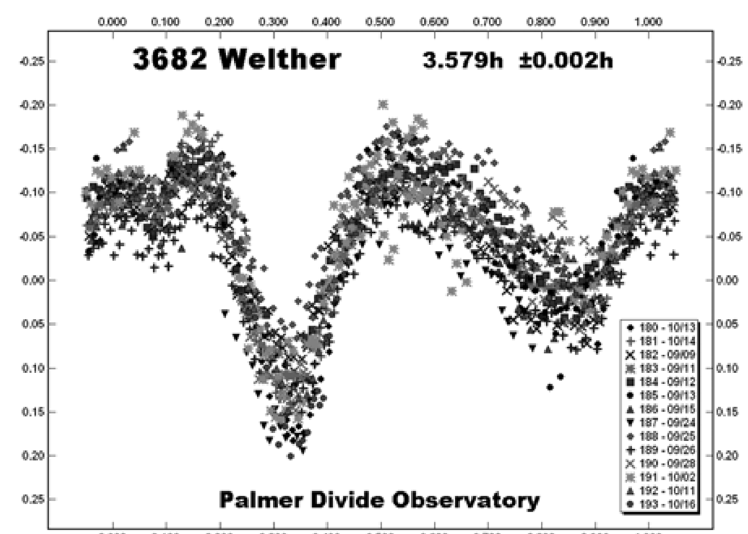

Janet Akyüz Mattei (1943–2004) (Photo by Michael Mattei, courtesy of the AAVSO.)

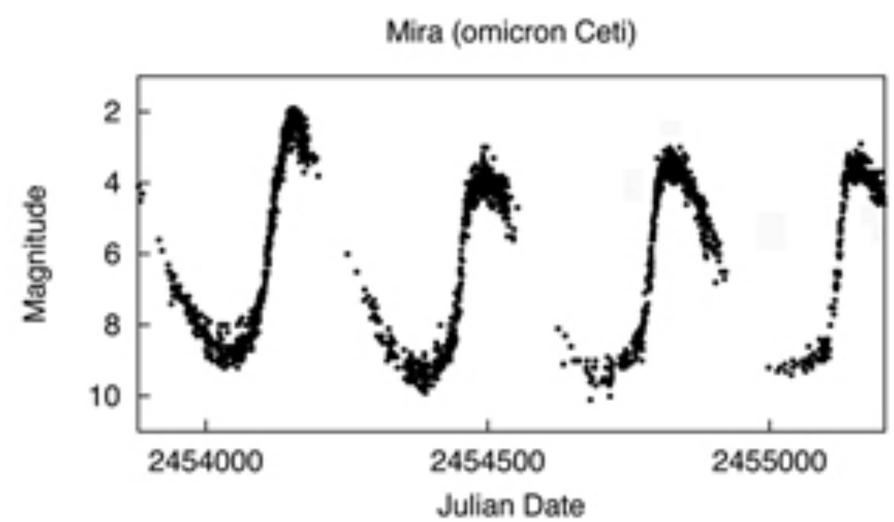
http://www.aavso.org

Görsel Gözlem / CCD ile Gözlem

	Strengths	Weaknesses
Visual	Quick Easier (minimal technology) Less equipment/Less expensive Sufficient accuracy for high-amplitude stars	Cannot go as faint without very large apertures Less precision Affected by observer physiology as well as technique
CCD	Higher precision More accepted by scientific community (if filtered and properly calibrated) Can go much fainter Can be automated	Time consuming Complex technology Requires more equipment and more expense







Parlak Değişen Yıldızlar / Çıplak Gözle Gözlem

Argelander Yöntemi

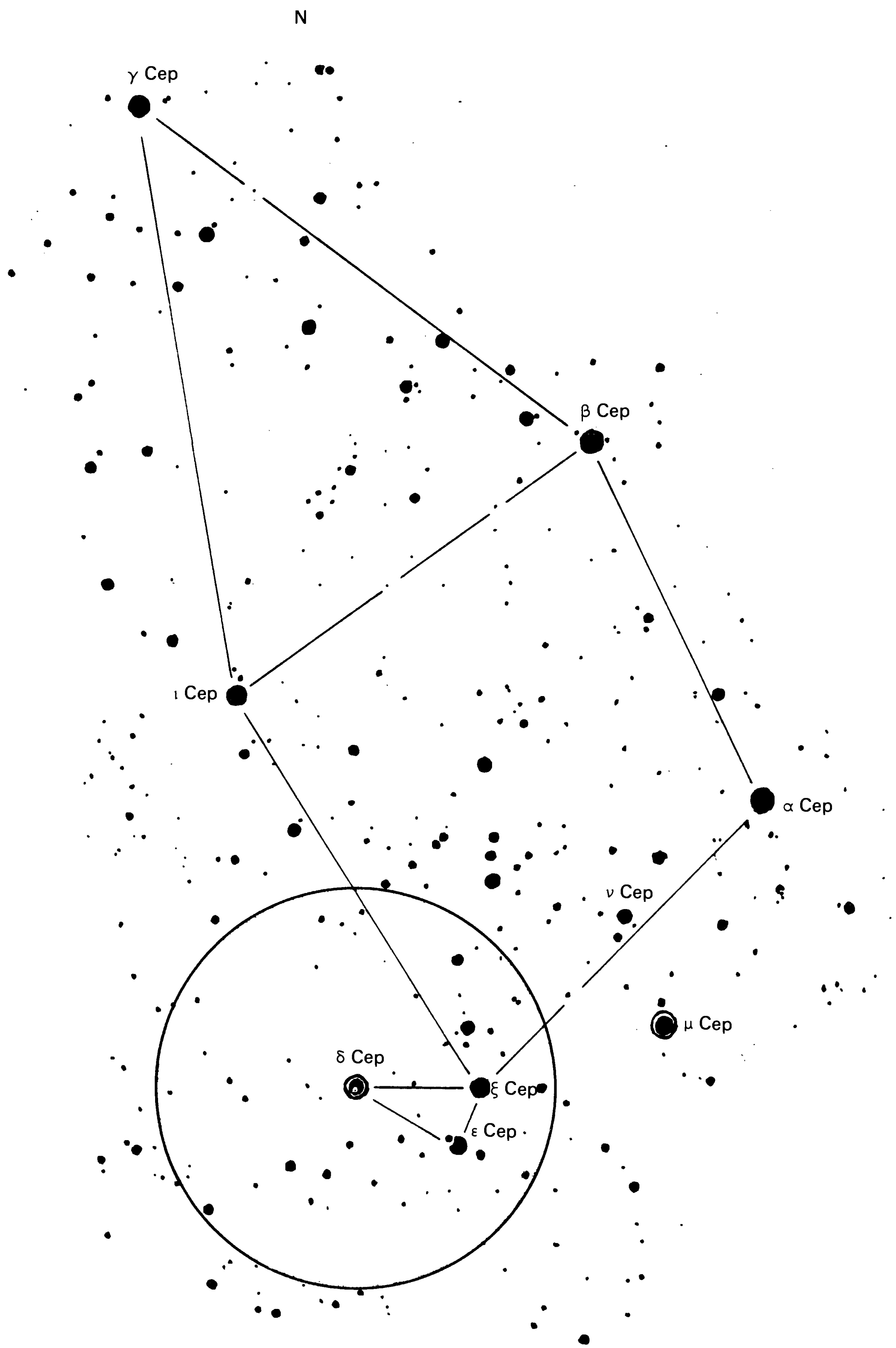
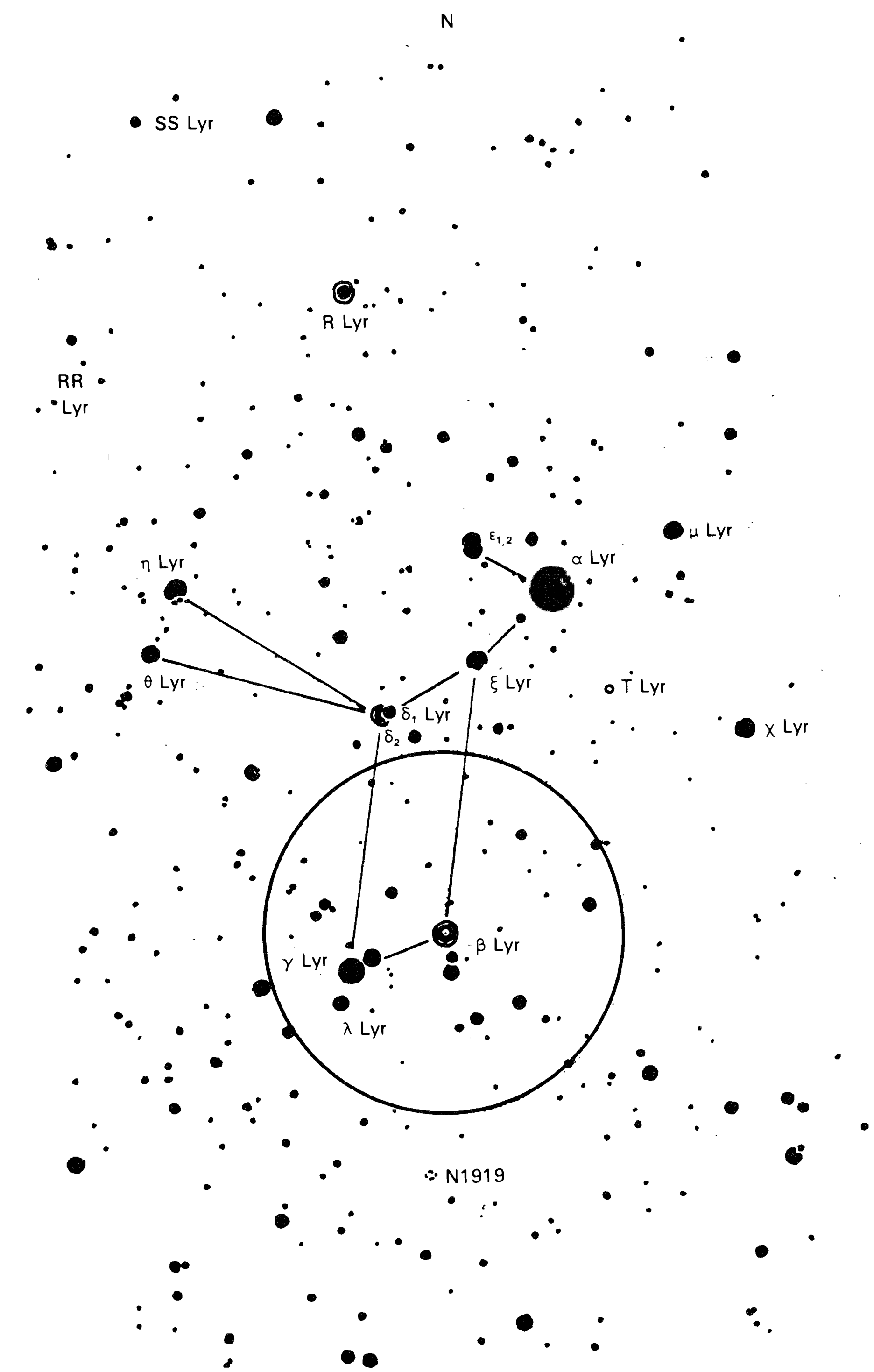
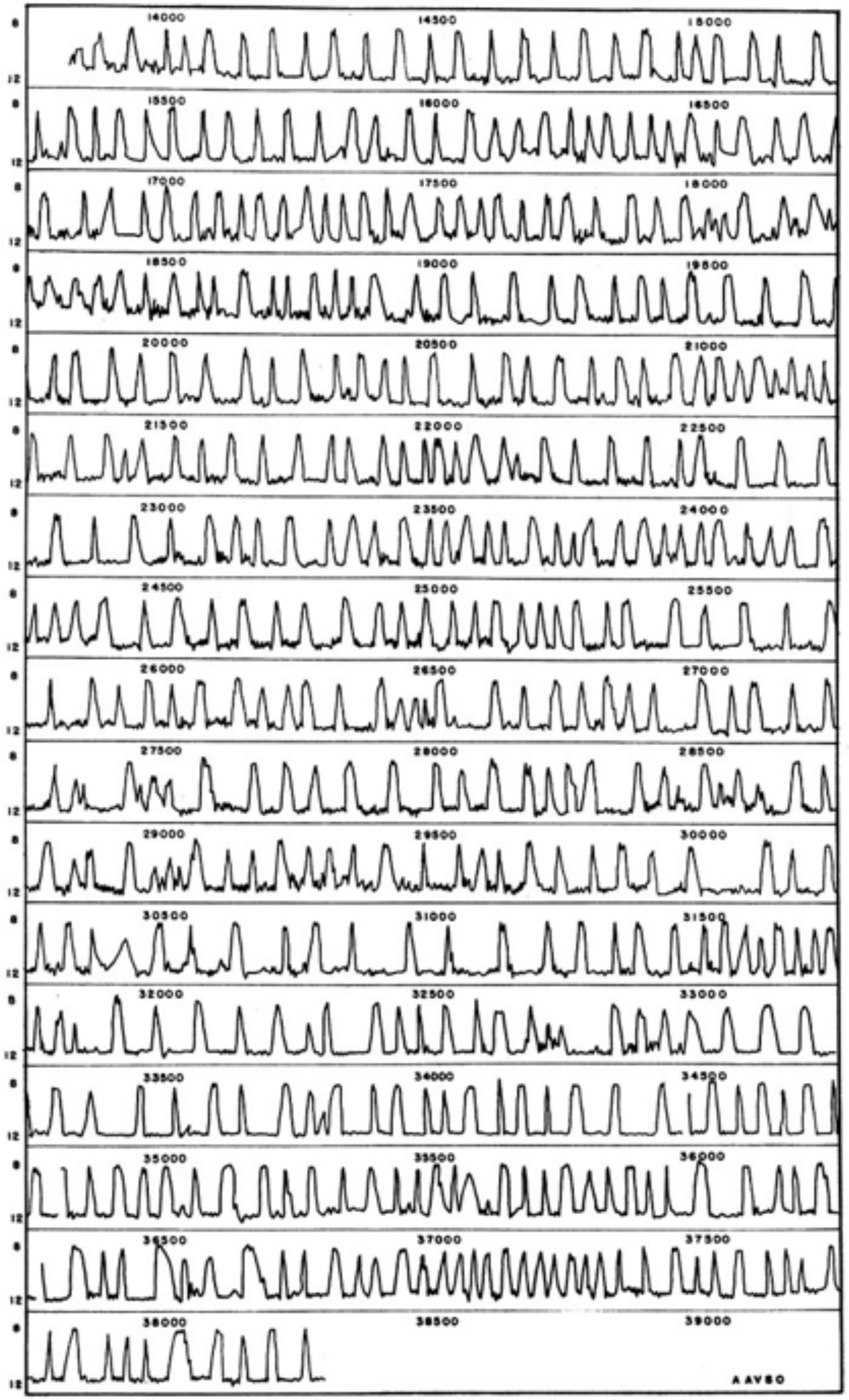


Figure 6.1. Delta Cephei: 22h27m.3, +58°10′; circle is 8°; Cepheid variable; range 3.5–4.4; period 5.37d.



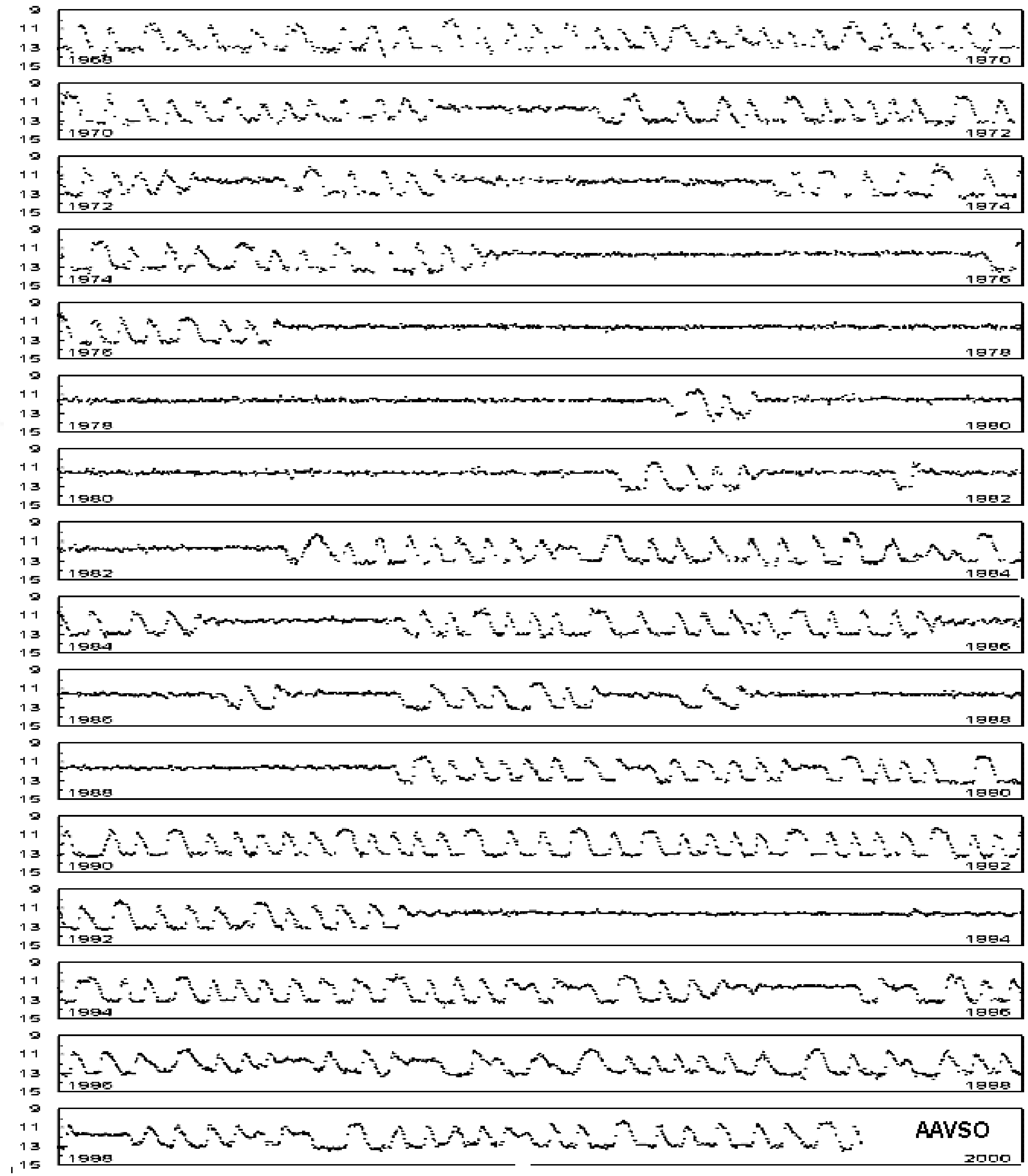


LIGHT CURVE OF SS CYGNI

1896 — 1963

1

Z Cam



İSTANBUL ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

Prof.Dr.M.Türker Özkan
Türker

83147

DOKTORA TEZİ

83147

CÜCE NOVALARIN UZUN SÜRELİ DAVRANIŞLARI

Astronomi ve Uzay Bilimleri Ana Bilim Dalı
Yıldız Atmosferleri Programı

Hazırlayan: Tansel AK

Danışman: Prof. Dr. M. Türker ÖZKAN

İSTANBUL

Şubat - 1999

Hemen belirtmeliyim ki, henüz değerlendirmeye girmemiş, neredeyse tümü ham vaziyetteki verilerin bir kısmını çalışmamın hizmetine sunan, doktora tezimin konusunu kendisi ile yüzyüze tartışma şansı bulabildiğim AAVSO Başkanı Dr. J.A. Mattei'ye, ve gene aynı nitelikteki verilerin çok kısa bir süreç içinde elime geçmesini sağlayan RASNZ Başkanı Dr. F.M. Bateson'a minnettarım.

İSTANBUL ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

YÜKSEK LİSANS TEZİ

Z CAM TÜRÜ CÜCE NOVALARIN DURAKSAMA ÖZELLİKLERİ

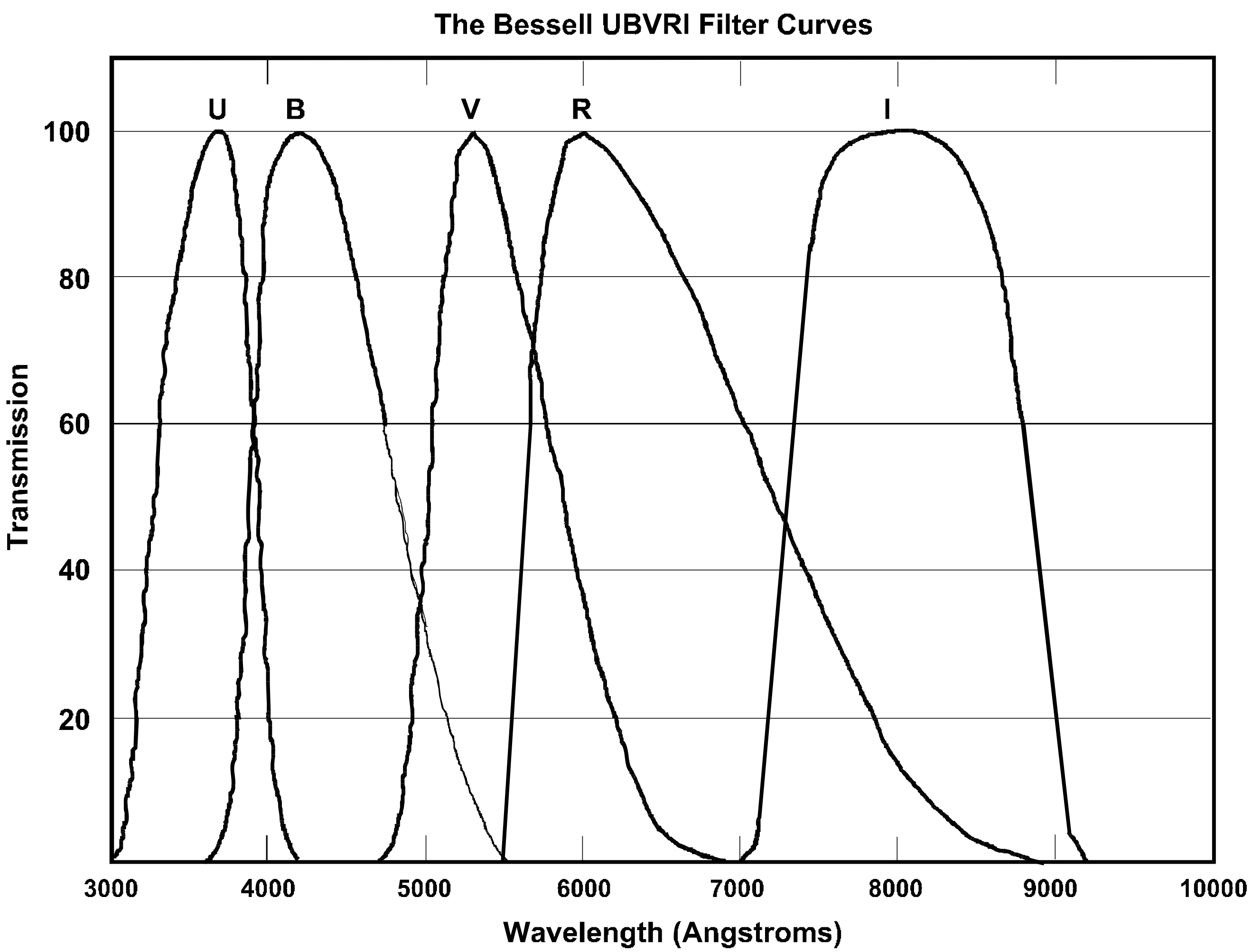
Astronom
Sinan ALİŞ
Astronomi ve Uzay Bilimleri Programı

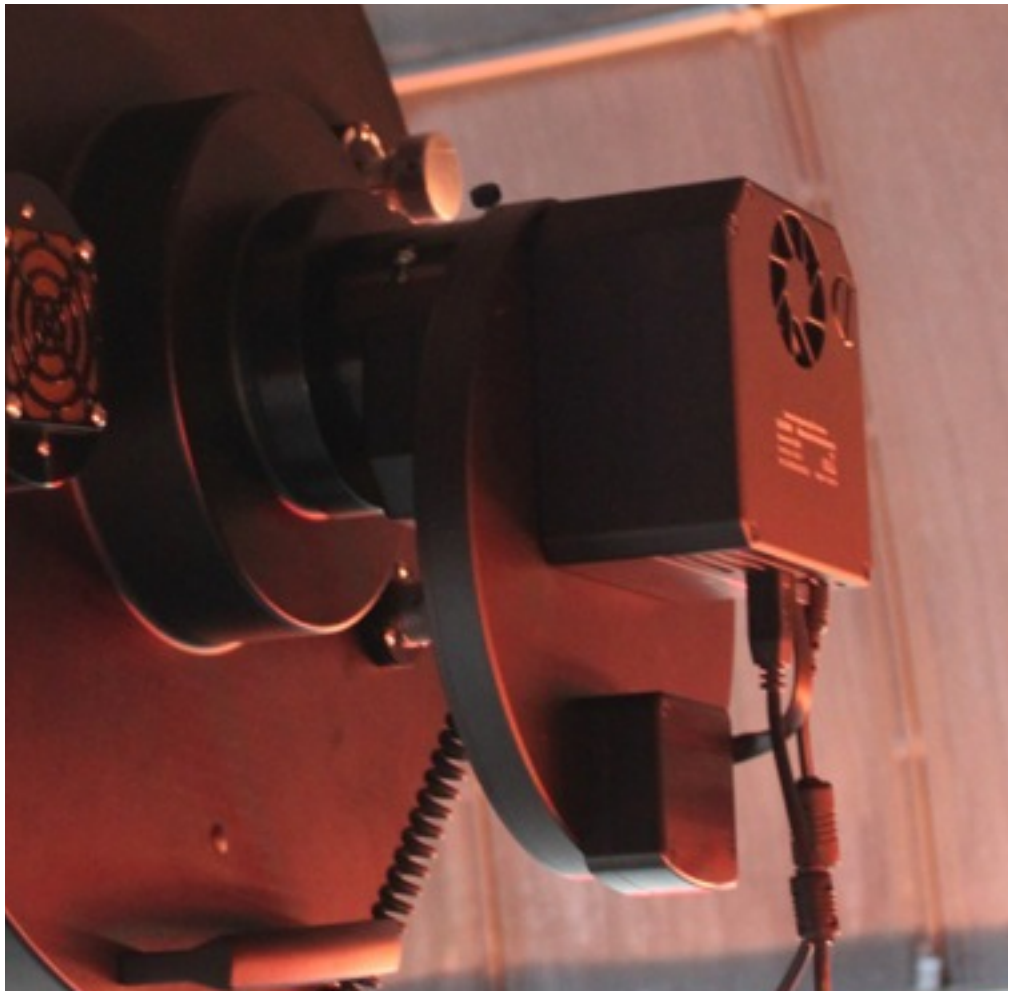
Danışman
Prof.Dr. M. Türker ÖZKAN

Haziran, 2004

AAVSO'yu 30 yıldır başarıyla yöneten Türk bilimci Sayın Dr. Janet Akyüz Mattei bu çalışmanın hazırlanma süreci içinde 22 Mart 2004 tarihinde, yakalandığı kan kanserinden kurtulamayarak hayata veda etmiştir. Çalıştığım yıldızlara ait en son verilere ulaşmam konusundaki yardımlarını ve hem amatör hem de profesyonel astronomi dünyasına yaptığı katkıları unutmam mümkün değil. Bu çalışmayı onun aziz hatırasına ithaf ediyorum.

Kataklismik değişenlerin bir alt sınıfı olan Z Cam türü cüce novalar, ışık eğrilerinde gösterdikleri duraksamalarla en ilginç yıldız gruplarından biridir. Bu türden davranışların araştırılmasında uzun dönemli görsel verilere ihtiyaç duyulmaktadır. Bu verilerin kesintisiz olması ayrıca beklenen bir durumdur. Ancak bu gözlemleri yapabilmek profesyonel astronomlar için neredeyse imkânsızdır. Bunun iki nedeni vardır: 1) Profesyonel astronomların yüzlerce yıldızı uzun süreli gözleyecek vakitleri yoktur, 2) Gözlemevlerinden teleskop zamanı alabilmek için buralara özgün projeler vermek gerekmektedir. Ne mutlu ki, günümüzde amatör astronomi oldukça gelişmiştir ve gökyüzüne meraklı insanlar sayesinde ihtiyaç duyulan veriler toplanabilmektedir. Bu çalışmadaki verilerin de alındığı AAVSO şu anda amatörlerin çalıştığı Dünya'daki en büyük kuruluştur. AAVSO gözlemcilerinin yoğun emekleri sayesinde oluşturulan veri bankasındaki gözlemler profesyonel araştırıcıların hizmetine sunulmaktadır. Bu bağlamda bu çalışmada kullanılan veriler için öncelikle AAVSO gözlemcilerine teşekkür etmek istiyorum. Onların karşılıksız çabaları olmasaydı bu ve benzeri çalışmaların ortaya çıkmaları mümkün olamazdı.





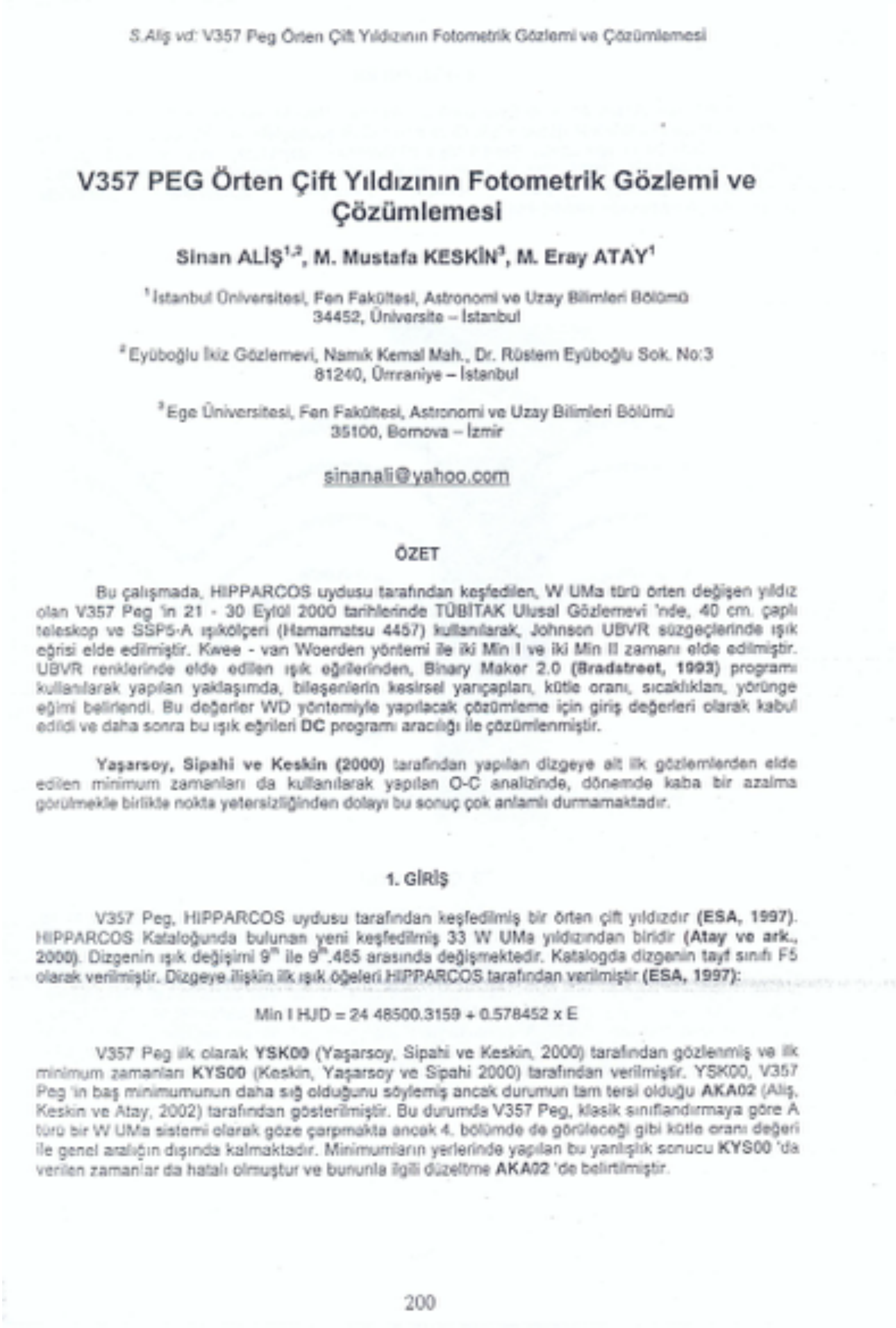
Magnitude		Band width [nm]	Effective wavelength [nm]
U	ultraviolet	66	367
B	blue	94	436
V	visual	88	545
R	red	138	638
I	infrared	149	797
u	ultraviolet	30	349
v	violet	19	411
b	blue	18	467
y	yellow	23	547

$$m = -2.5 * \log(I)$$

$$I = \text{Counts} * \text{Gain}$$

Sonuçların Yayınlanması / Bilimsel Makale Yazımı

Ulusal Astronomi Kongresi   IBVS / JAAVSO   *SCI-Expanded???*



V357 PEG Örten Çift Yıldızının Fotometrik Gözlemi ve Çözümlemesi

Sinan ALİŞ[1,2], M. Mustafa KESKİN[3], M. Eray ATAY[1]

[1] İstanbul Üniversitesi, Fen Fakültesi, Astronomi ve Uzay Bilimleri Bölümü 34452, Üniversite – İstanbul

[2] Eyüboğlu İkiz Gözlemevi, Namık Kemal Mah., Dr. Rüstem Eyüboğlu Sok. No:3 81240, Ümraniye – İstanbul

[3] Ege Üniversitesi, Fen Fakültesi, Astronomi ve Uzay Bilimleri Bölümü 35100, Bornova – İzmir

sinanali@yahoo.com

ÖZET

Bu çalışmada, HIPPARCOS uydusu tarafından keşfedilen, W UMa türü örten değişen yıldız olan V357 Peg 'in 21 - 30 Eylül 2000 tarihlerinde TÜBİTAK Ulusal Gözlemevi 'nde, 40 cm. çaplı teleskop ve SSP5-A ışıkölçeri (Hamamatsu 4457) kullanılarak, Johnson UBVR süzgeçlerinde ışık eğrisi elde edilmiştir. Kwee - van Woerden yöntemi ile iki Min I ve iki Min II zamanı elde edilmiştir. UBVR renklerinde elde edilen ışık eğrilerinden, Binary Maker 2.0 **(Bradstreet, 1993)** programı kullanılarak yapılan yaklaşımda, bileşenlerin kesirsel yarıçapları, kütle oranı, sıcaklıkları, yörünge eğimi belirlendi. Bu değerler WD yöntemiyle yapılacak çözümleme için giriş değerleri olarak kabul edildi ve daha sonra bu ışık eğrileri **DC** programı aracılığı ile çözümlenmiştir.

Yaşarsoy, Sipahi ve Keskin (2000) tarafından yapılan dizgeye ait ilk gözlemlerden elde edilen minimum zamanları da kullanılarak yapılan O-C analizinde, dönemde kaba bir azalma görülmekle birlikte nokta yetersizliğinden dolayı bu sonuç çok anlamlı durmamaktadır.

1. GİRİŞ

V357 Peg, HIPPARCOS uydusu tarafından keşfedilmiş bir örten çift yıldızdır **(ESA, 1997)**. HIPPARCOS Kataloğunda bulunan yeni keşfedilmiş 33 W UMa yıldızından biridir **(Atay ve ark., 2000)**. Dizgenin ışık değişimi 9^m ile $9^m.485$ arasında değişmektedir. Katalogda dizgenin tayf sınıfı F5 olarak verilmiştir. Dizgeye ilişkin ilk ışık öğeleri HIPPARCOS tarafından verilmiştir **(ESA, 1997)**:

$$\text{Min I HJD} = 24\,48500.3159 + 0.578452 \times E$$

V357 Peg ilk olarak **YSK00** (Yaşarsoy, Sipahi ve Keskin, 2000) tarafından gözlenmiş ve ilk minimum zamanları **KYS00** (Keskin, Yaşarsoy ve Sipahi 2000) tarafından verilmiştir. YSK00, V357 Peg 'in baş minimumunun daha sığ olduğunu söylemiş ancak durumun tam tersi olduğu **AKA02** (Aliş, Keskin ve Atay, 2002) tarafından gösterilmiştir. Bu durumda V357 Peg, klasik sınıflandırmaya göre A türü bir W UMa sistemi olarak göze çarpmakta ancak 4. bölümde de görüleceği gibi kütle oranı değeri ile genel aralığın dışında kalmaktadır. Minimumların yerlerinde yapılan bu yanlışlık sonucu **KYS00** 'da verilen zamanlar da hatalı olmuştur ve bununla ilgili düzeltme **AKA02** 'de belirtilmiştir.

New Astronomy

A W UMa type system from Southern Hemisphere: CN Hydri

328   Samolyk, JAAVSO Volume 41, 2013

Recent Minima of 199 Eclipsing Binary Stars

Gerard Samolyk
P.O. Box 20677; Greenfield, WI 53220; gsamolyk@wi.rr.com

Received October 4, 2013; accepted October 4, 2013

Abstract This paper continues the publication of times of minima for eclipsing binary stars from observations reported to the AAVSO EB section. Times or minima from observations received from December 2012 through September 2013 are presented.

1. Recent Observations

The accompanying list contains times of minima calculated from recent CCD observations made by participants in the AAVSO's eclipsing binary program. This list will be web-archived and made available through the AAVSO ftp site at ftp://ftp.aavso.org/public/datasets/gsamoj412.txt. This list, along with the eclipsing binary data from earlier AAVSO publications, is also included in the Lichtenknecker database (Kreiner 2011) administrated by the Bundesdeutsche Arbeitsgemeinschaft für Veränderliche Sterne e. V. (BAV) at: http://www.bav-astro.de/LkDB/index.php?lang=en. These observations were reduced by the observers or the writer using the method of Kwee and Van Worden (1956). Column F in Table 1 indicates the filter used. A "C" indicates a clear filter. The standard error is included when available.

The linear elements in the *General Catalogue of Variable Stars* (GCVS, Kholopov *et al.* 1985) were used to compute the O–C values for most stars. For a few exceptions where the GCVS elements are missing or are in significant error, light elements from another source are used: AC CMi (Samolyk 2008), CW Cas (Samolyk 1992a), DV Cep (Frank and Lichtenknecker 1987), DF Hya (Samolyk 1992b), DK Hya (Samolyk 1990), GU Ori (Samolyk 1985). The light elements for QX And, V952 Cas, EX Leo, and CU Tau are from Kreiner (2013). O–C values listed in this paper can be directly compared with values published in the *AAVSO Observed Minima Timings of Eclipsing Binaries* series.

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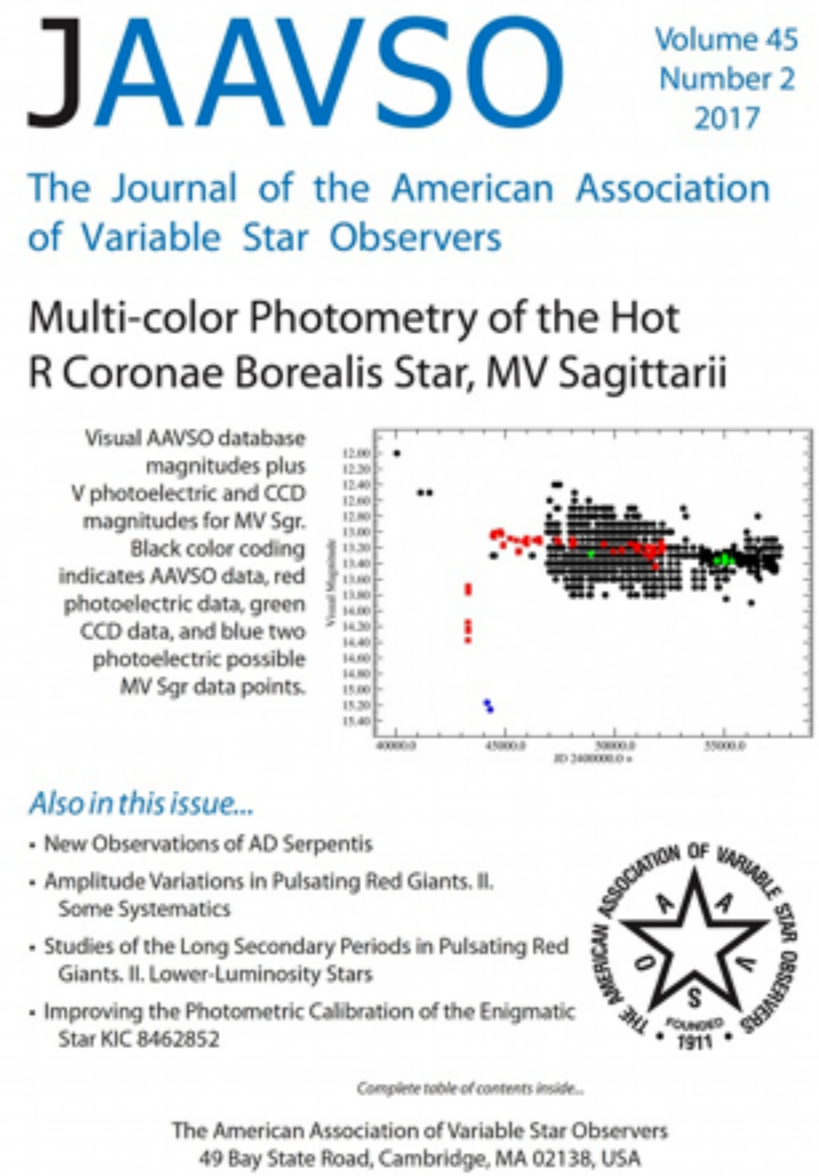
Frank, P., and Lichtenknecker, D. 1987, *BAV Mitt.*, No. 47, 1.
Kreiner, J. M. 2011, Lichtenknecker-Database of the BAV (http://www.bav-astro.de/~tl/cgi-bin/varstars_cgi).
Kreiner J. M. 2013, Up-to-date linear elements of eclipsing binaries (http://www.as.up.krakow.pl/ephem/), Cracow Pedagogical Univ., Cracow.
Kholopov, P. N., *et al.* 1985, *General Catalogue of Variable Stars*, 4th ed., Moscow.



JAAVSO   Volume 45 Number 2 2017

The Journal of the American Association of Variable Star Observers

Multi-color Photometry of the Hot R Coronae Borealis Star, MV Sagittarii

Visual AAVSO database magnitudes plus V photoelectric and CCD magnitudes for MV Sgr. Black color coding indicates AAVSO data, red photoelectric data, green CCD data, and blue two photoelectric possible MV Sgr data points.

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49 Bay State Road, Cambridge, MA 02138, USA

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Cafolla, C.; Mathew, R.S.; Edge, A.C.; Swinbank, A.M.; Lansbury, G.B.; Wilson, R.W.; Butterley, T.; Lucey, J.R.; Hardy, L.K.; Littlefair, S.P.; Dhillon, V.S.
10 August 2017

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6214 Discovery of a New delta Scuti Variable in the Field of RW UMi
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23 May 2017

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COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 5282

Konkoly Observator
Budapest
31 May 2002

HU ISSN 0374 – 067

ERRATUM TO IBVS NO. 4855 AND TIMES OF MINIMA OF THE ECLIPSING BINARY V357 PEGASI

ALIS, SINAN[1,2]; KESKIN, M. MUSTAFA[3]; ATAY, M. ERAY[1]

[1] University of Istanbul, Faculty of Science, Department of Astronomy and Space Sciences, 34452 Universit Istanbul, Turkey, email: sinanali@yahoo.com

[2] Eyuboglu Twin Observatories, Namik Kemal Mah, Dr. Rustem Eyuboglu Sok, No:3 81240, Umraniy Istanbul, Turkey

[3] Ege University, Science Faculty, Astronomy and Space Sciences Department, 35100, Bornova - Izmir, Turke

Observatory and telescope:
16″ Cassegrain telescope at TUBITAK† National Observatory.

Detector:	SSP-5A photoelectric photometer, Hamamatsu 4457 pmt.

Method of data reduction:
Reduction of the data were made in the usual way.

Method of minimum determination:
Times of minima were determined by the method of Kwee and van Woerden

Observed star(s):							
Star name	GCVS type	Coordinates (J2000) RA	Dec	Comp. star	Ephemeris E 2400000+	P [day]	Source
V357 Peg	EW	23 45 35	+25 28 52	HIP 116688	48500.3159	0.578452	1

Source(s) of the ephemeris:
1. The Hipparcos & Tycho Catalogues (ESA, 1997)

Times of minima:

Star name	Time of min. HJD 2400000+	Error	Type	Filter	$O-C$ [day]	Rem.
V357 Peg	51810.4986	0.0004	II	U,B,V,R	−0.0007	This work
	51812.5233	0.0005	I	U,B,V,R	−0.0006	This work
	51817.4412	0.0010	II	U,B,V,R	0.0005	This work
	51819.4662	0.0010	I	U,B,V,R	0.0009	This work

†TUBITAK : The Scientific and Technical Research Council of Turkey

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 6102

Konkoly Observatory
Budapest
11 April 2014

HU ISSN 0374 – 0676

TIMES OF MINIMA OF ECLIPSING CATACLYSMIC VARIABLES

ATALI, H.B.; ALIS, S.; YELKENCI, K.; SAYGAC, A.T.; AKSOYU NURANOGLU, Y.; FISEK, S.; ULGEN, E.K.

Department of Astronomy and Space Sciences, Faculty of Science, Istanbul University, 34119, Istanbul, Turkey; e-mail: salis@istanbul.edu.tr

Observatory and telescope:
0.6m Ritchey-Chrétien (f/8) telescope (IST60) at Ulupinar Astrophysical Observatory, Canakkale.

Detector:	Apogee Alta U42 CCD camera, 2048 × 2048 pixels with a read-out noise of 10e⁻ RMS; SBIG STL-1001E CCD camera, 1024 × 1024 pixels with a read-out noise of 14.8e⁻ RMS.

Method of data reduction:
Reduction of the CCD frames was made in the usual way using IRAF[1] package.

Method of minimum determination:
The minima times were computed with Kwee & Van Woerden (1956) method.

Times of minima:

Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
BH Lyn	56195.5590	0.001	I	White-light	C2
TT Tri	56195.2590	0.002	I	White-light	C2
	56195.3990	0.003	I	White-light	C2
	56570.3250	0.002	I	White-light	C1
HS0455+8315	56193.3580	0.001	I	White-light	C2
	56193.5070	0.001	I	White-light	C2
	56571.2650	0.005	I	White-light	C1
	56571.4140	0.005	I	White-light	C1
PX And	56158.3920	0.002	I	White-light	C1
	56194.5390	0.003	I	White-light	C2
	56570.5200	0.001	I	White-light	C1
V1315 Aql	56159.2930	0.001	I	White-light	C1
	56159.4330	0.001	I	White-light	C1

[1] IRAF is distributed by the National Optical Astronomical Observatories, operated by the Association of the Universities for Research in Astronomy, inc., under cooperative agreement with the National Science Foundation

Keşif?

COMMISSIONS G1 AND G4 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Volume 63 Number 6214 DOI: 10.22444/IBVS.6214

Konkoly Observatory
Budapest
05 September 2017

HU ISSN 0374 – 0676

DISCOVERY OF A NEW δ SCUTI VARIABLE IN THE FIELD OF RW UMi

ALIS, S.[1,2]; SAYGAC, A. T.[1,2]; FISEK, S.[1]; ESENOGLU, H. H.[1,2]

[1] Istanbul University, Department of Astronomy and Space Sciences, 34119 Beyazit, Istanbul, Turkey

e-mail: salis@istanbul.edu.tr

[2] Istanbul University Observatory Research and Application Centre, 34119 Beyazit, Istanbul, Turkey

During observations of the old nova RW UMi a new variable has been identified in the same field. RW UMi, new variable, and comparison stars are marked in the finding chart given in Fig. 1. Variability of this star noticed as it was being used as a comparison star of RW UMi. Light curves that can be seen in Fig. 2, reveal that the new star is a short-period pulsator, likely a δ Scuti star.

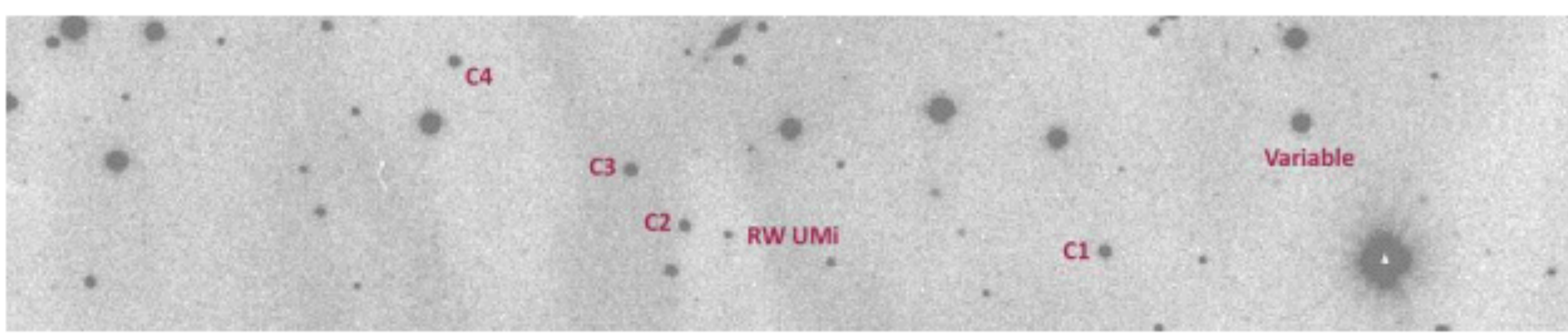
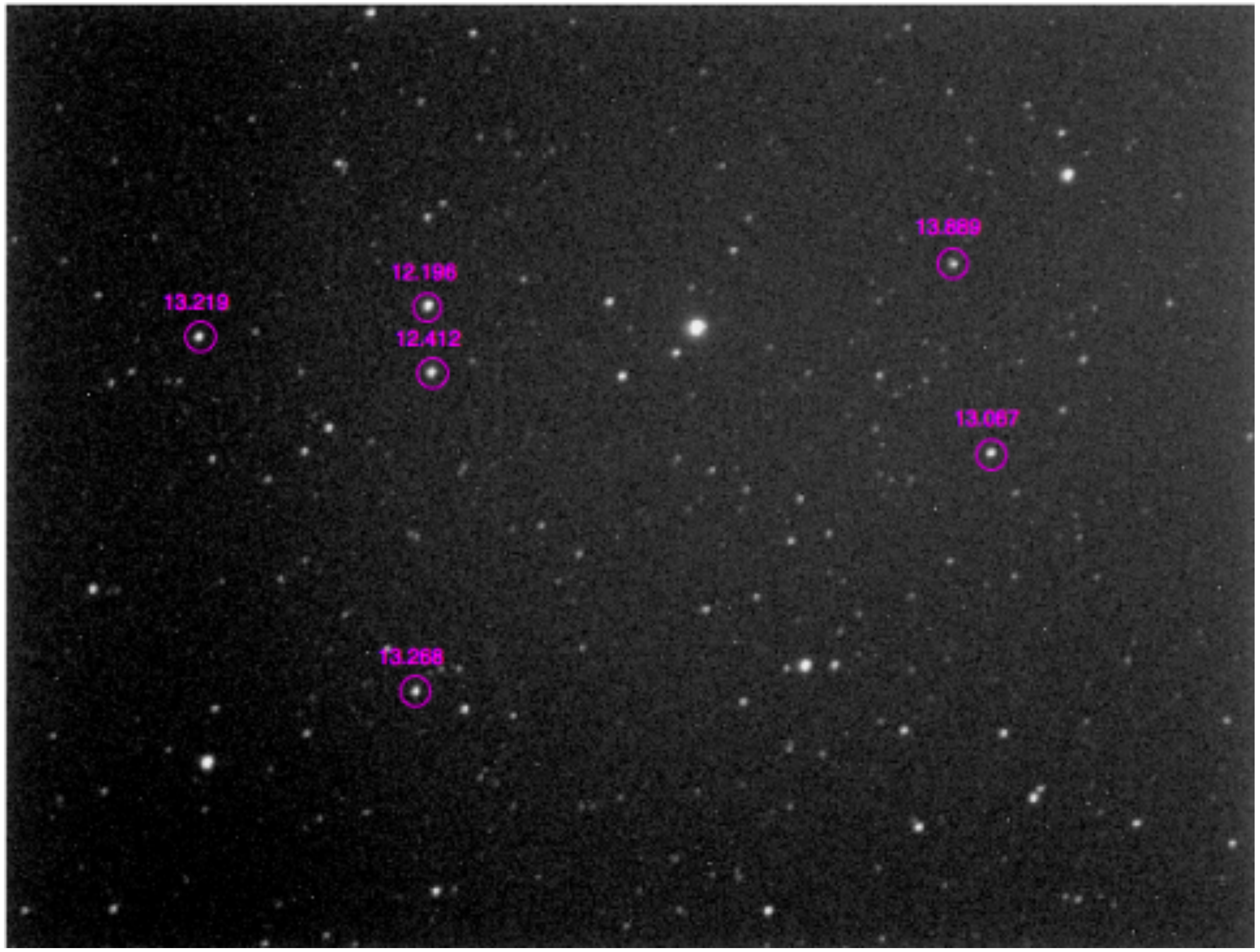
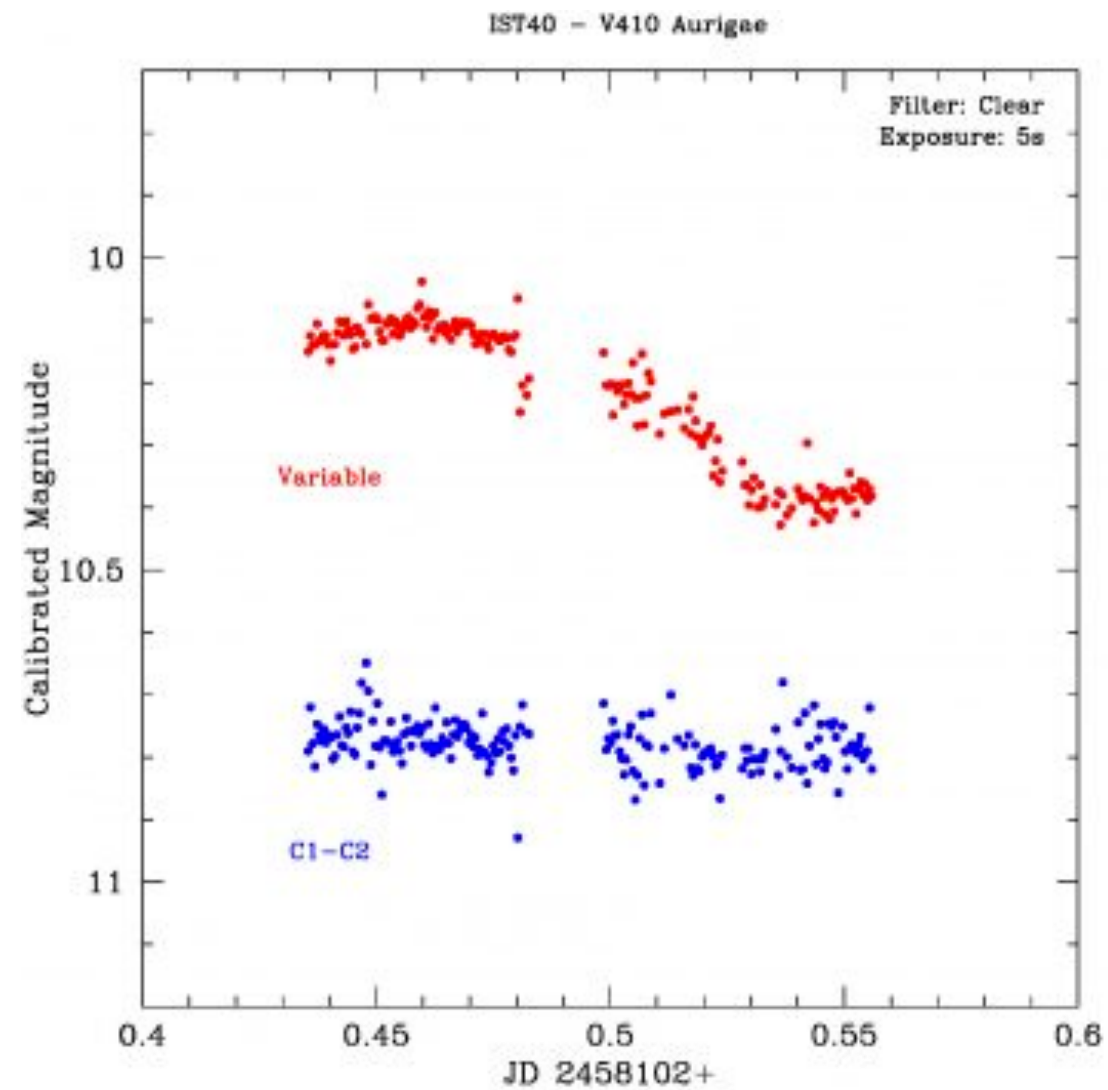


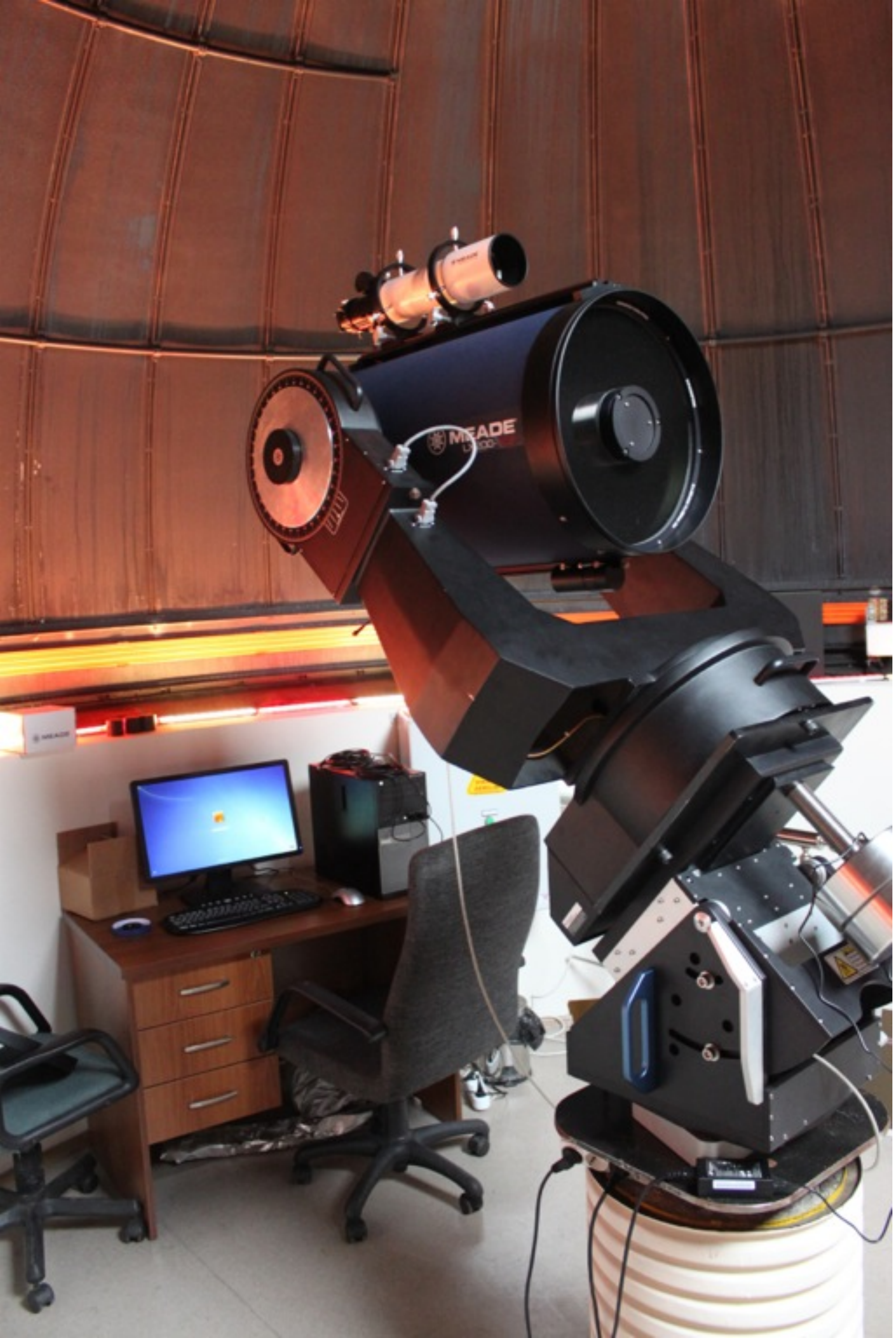
Figure 1. Identification chart of the field. New variable, RW UMi and comparison stars are marked.

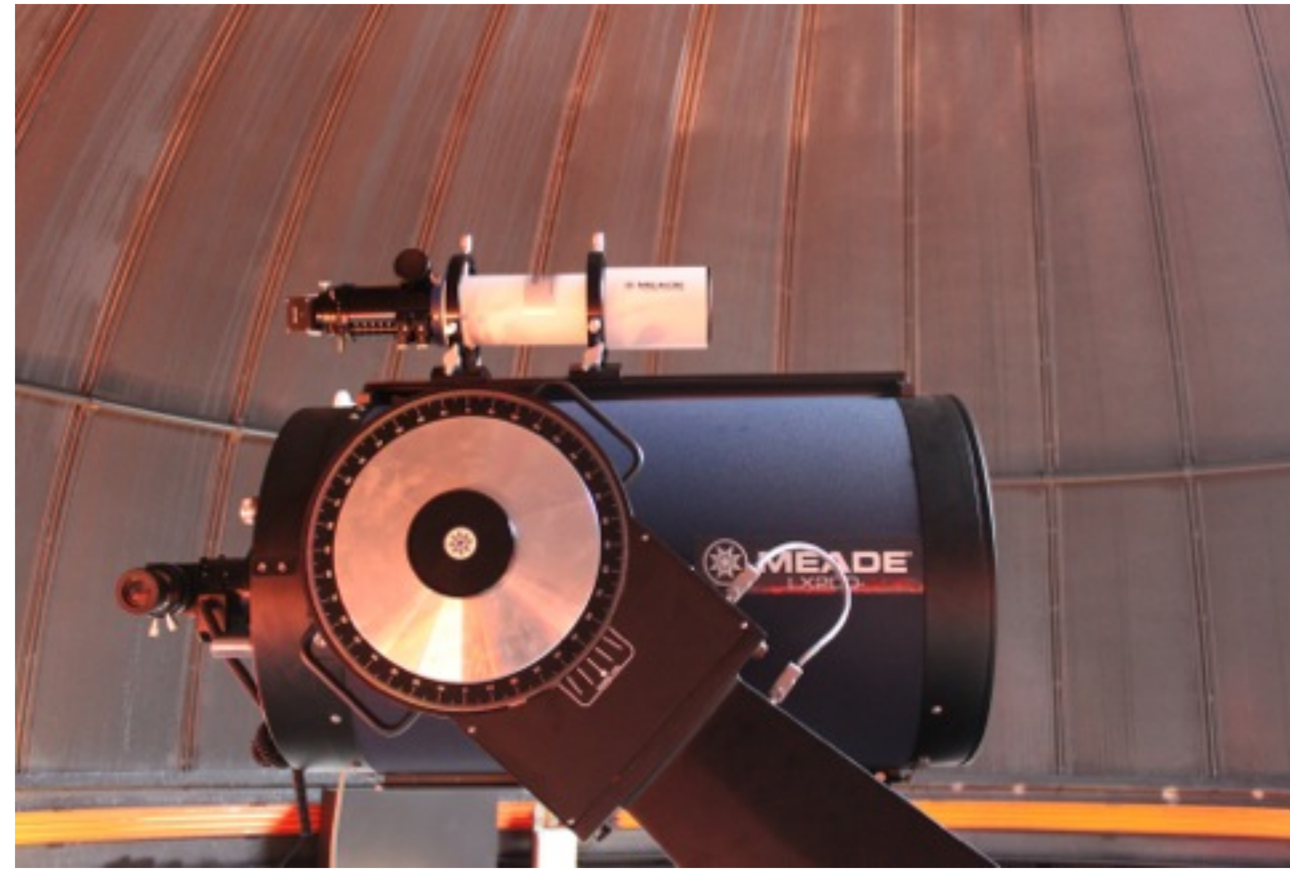
İST40 ile İlk Bilimsel Gözlem: V410 Aur

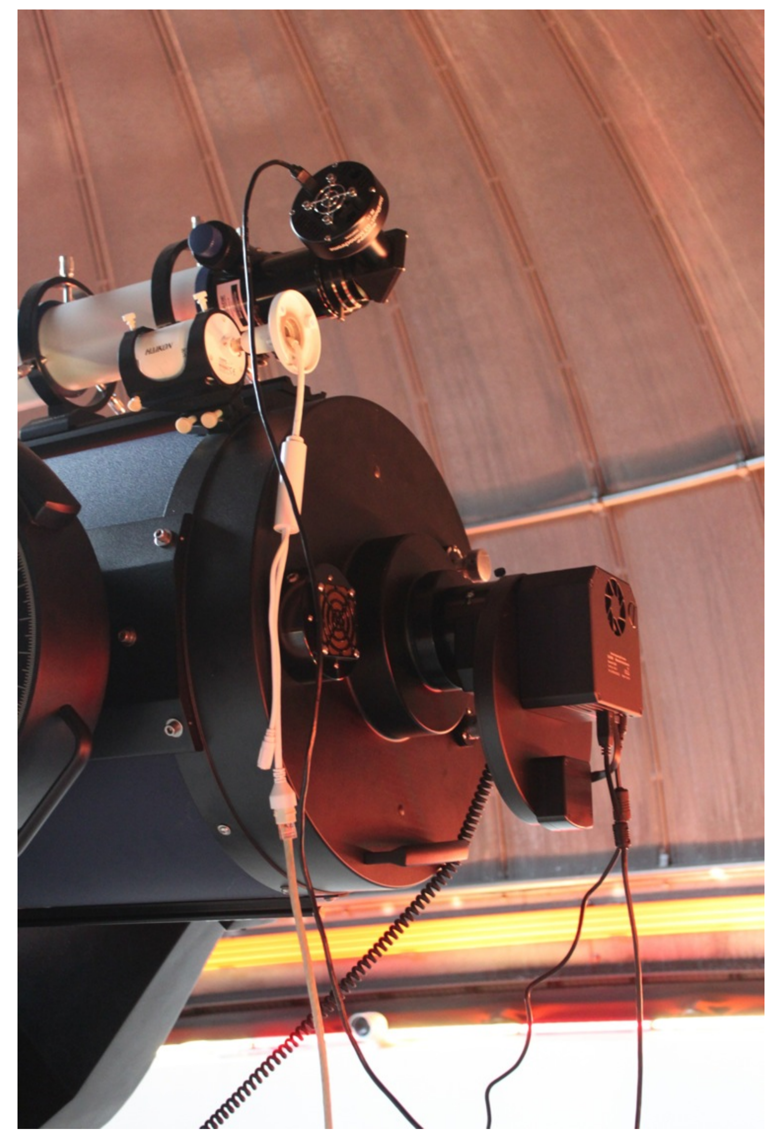


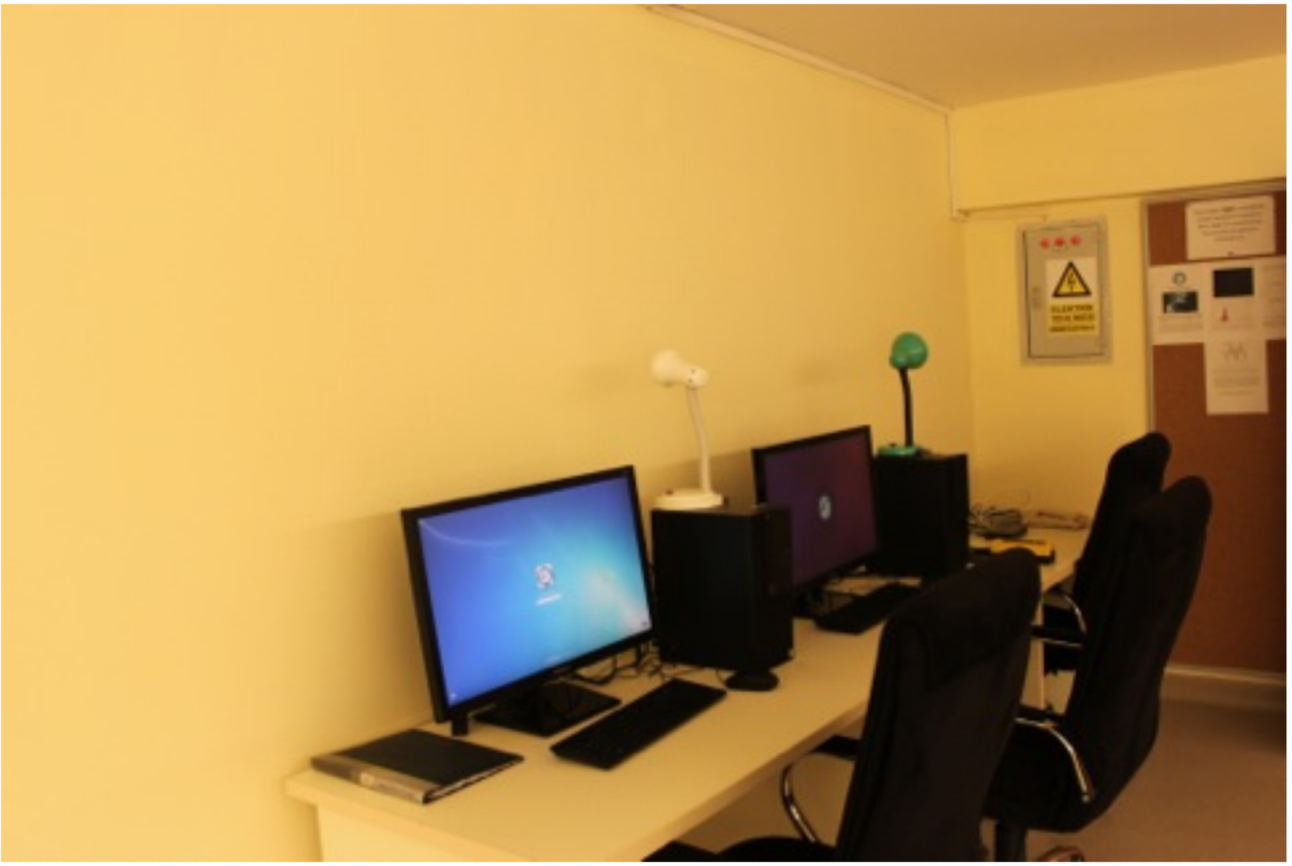


Gözlemciler: Sinan Aliş, Süleyman Fişek, E. Kaan Ülgen, Olcaytuğ Özgüllü, Uğurcan Çelik

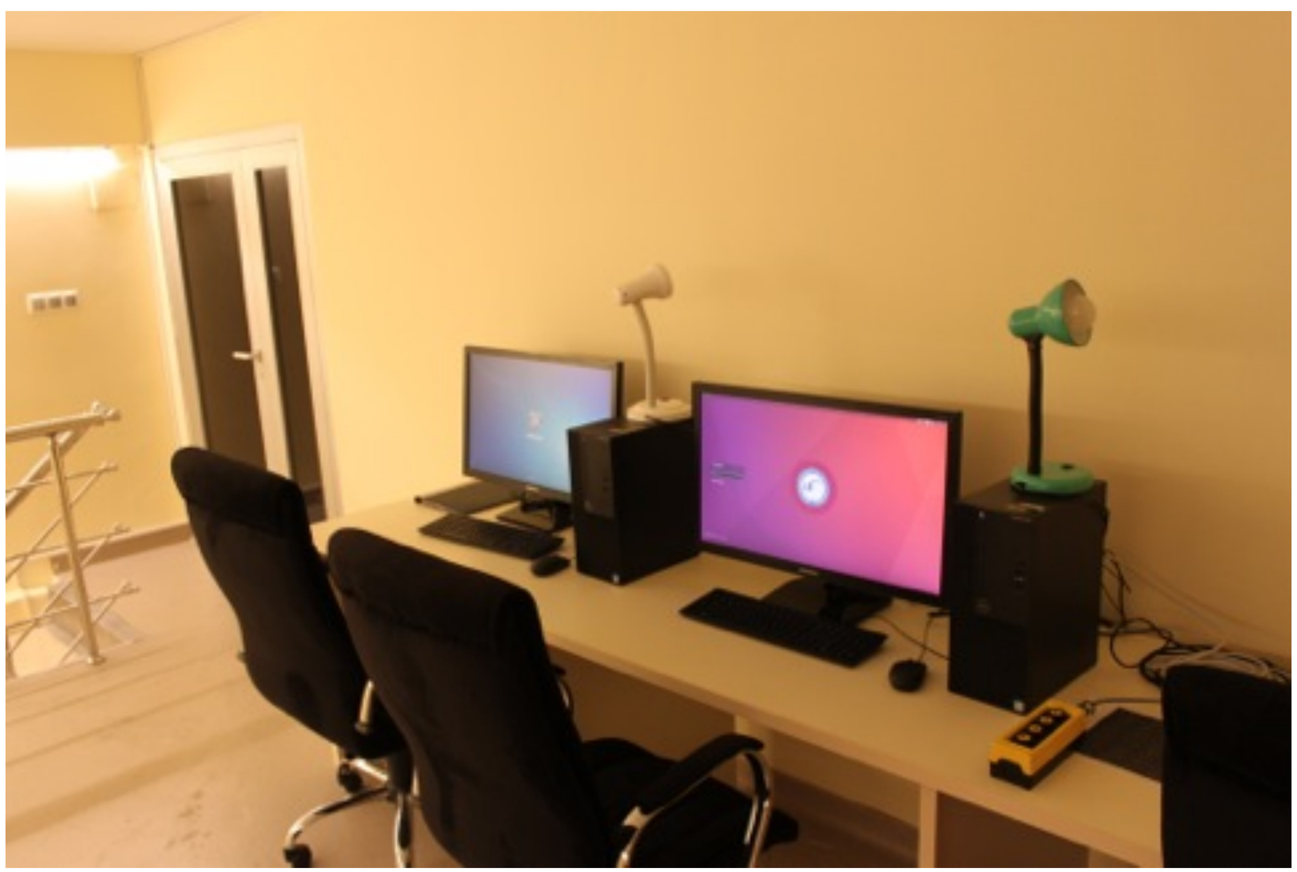

MEADE


MEADE





İST40
Kontrol Odası



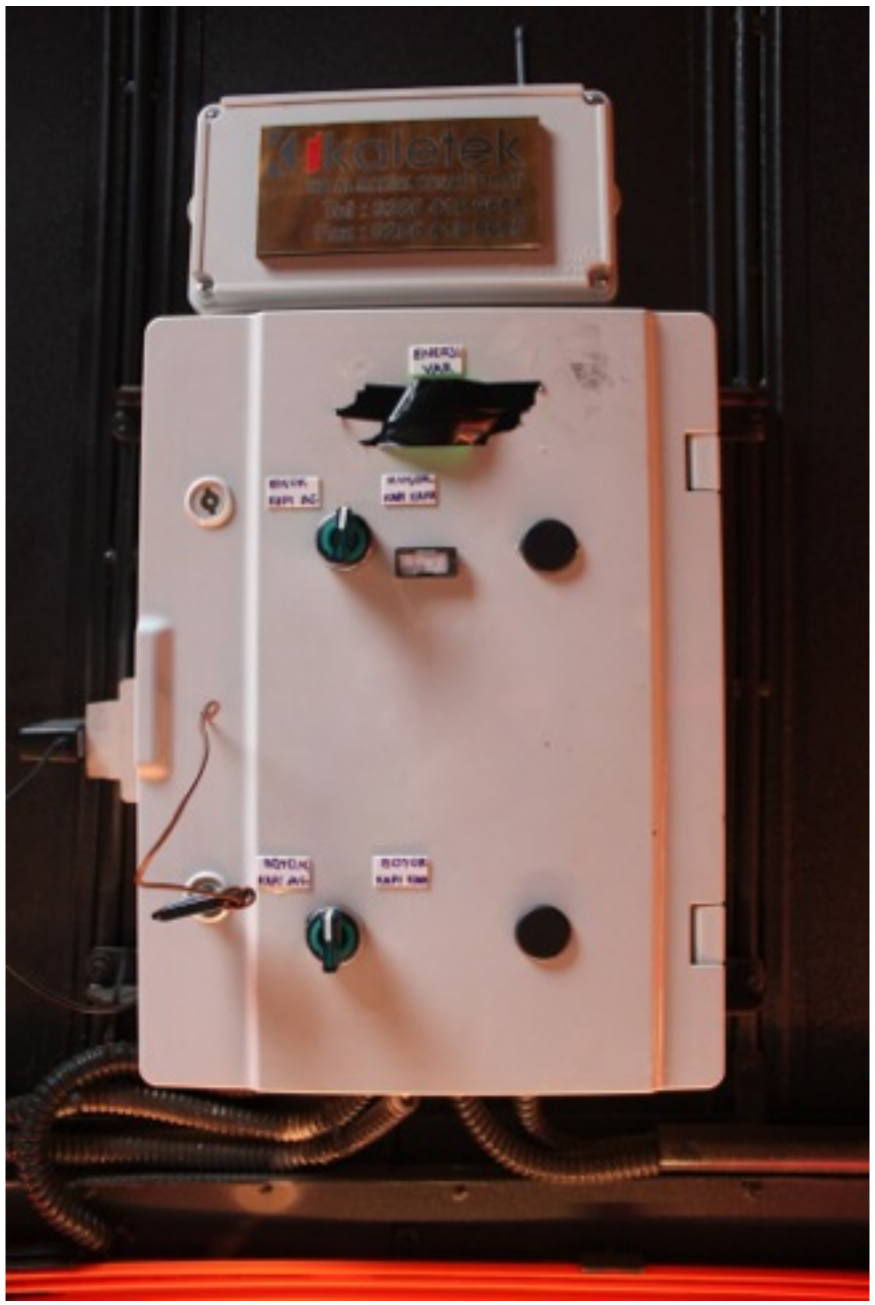
2 Bilgisayar:
Windows + Linux

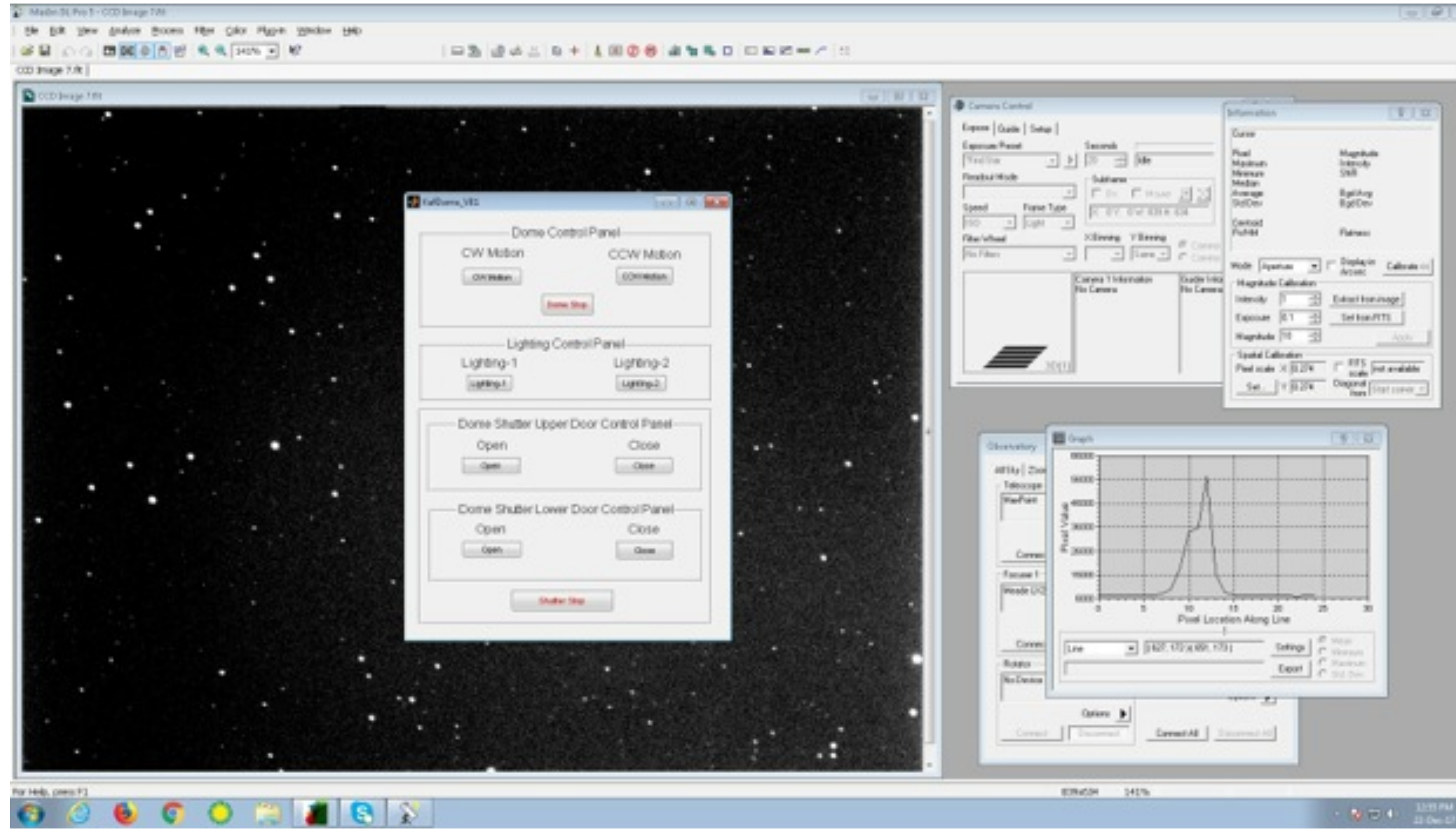
Kubbe kontrol (dönüş)
İç aydınlatma kontrol

İST40 Kameraları (IR)

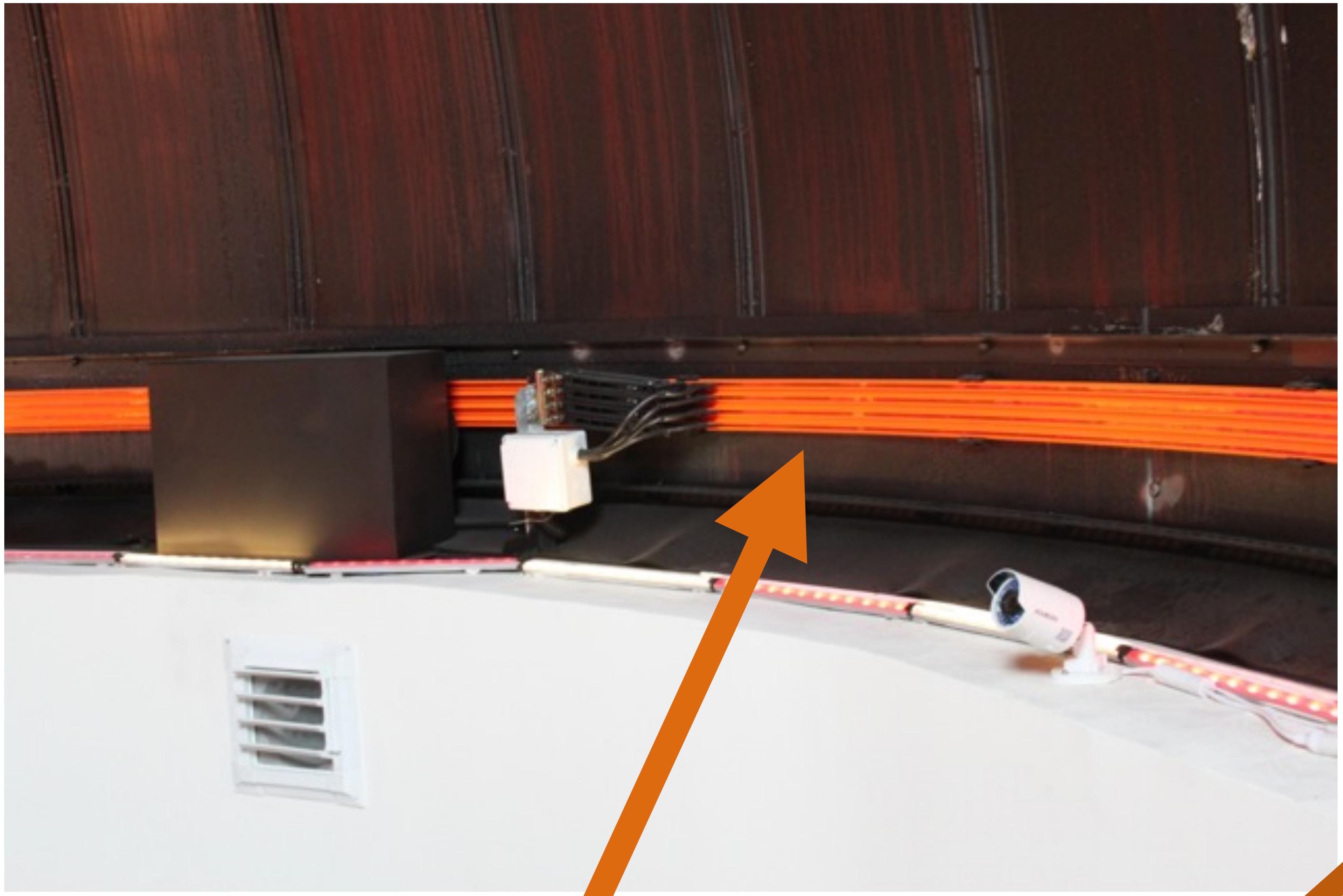
Kubbe Otomasyonu

KafDome





Kubbede Dikkat Edilecekler



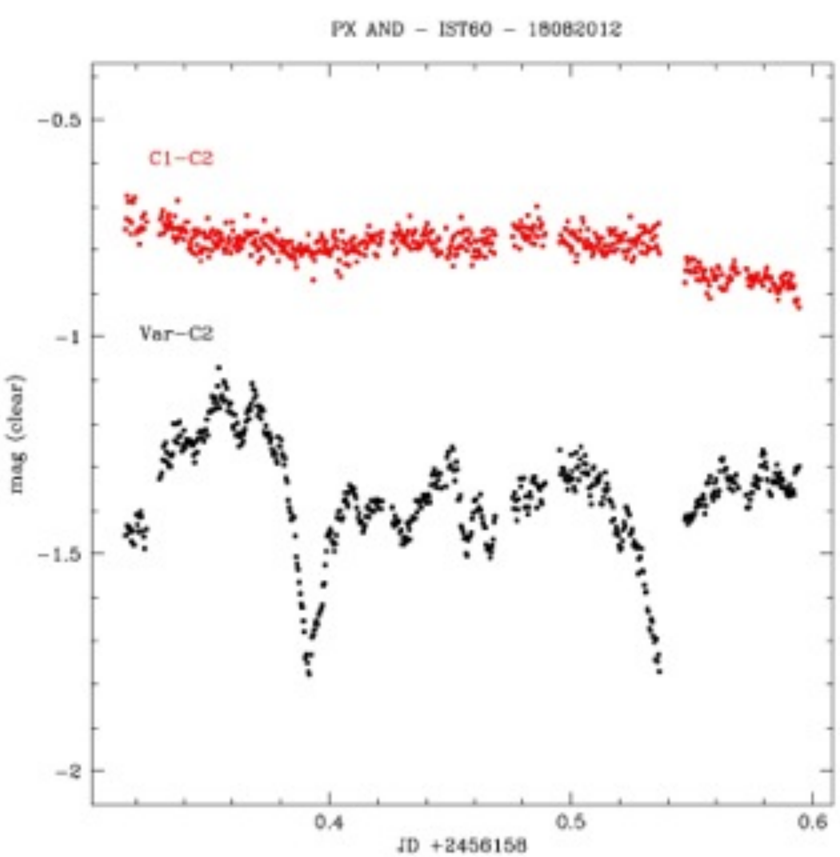
Turuncu bara sistemi
Güç kontrol kutusu

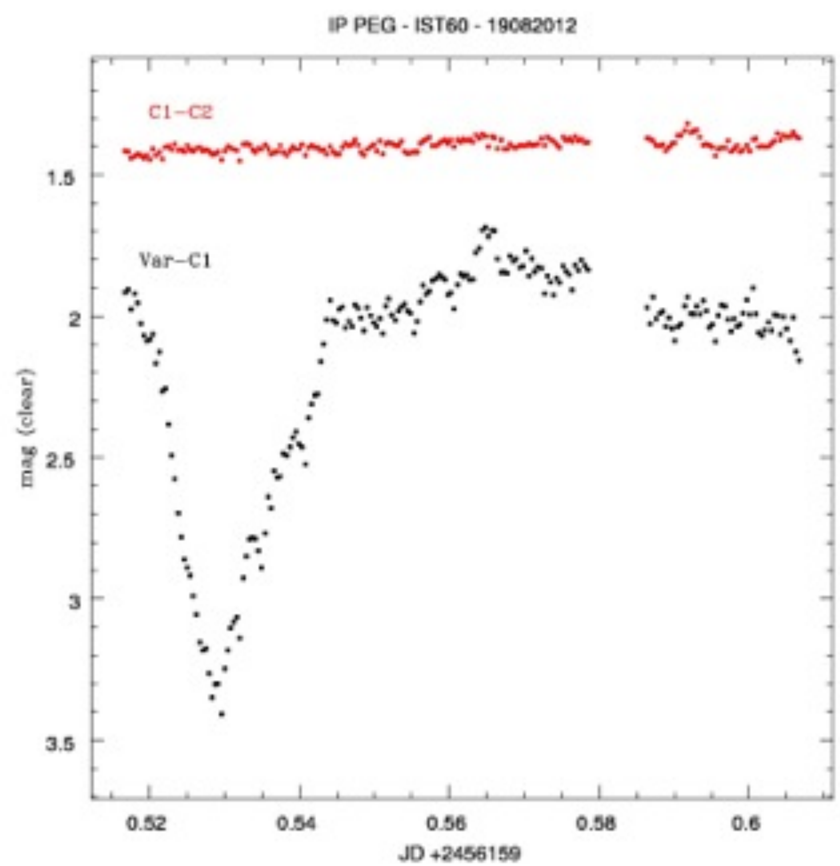
Kubbenin gücü!

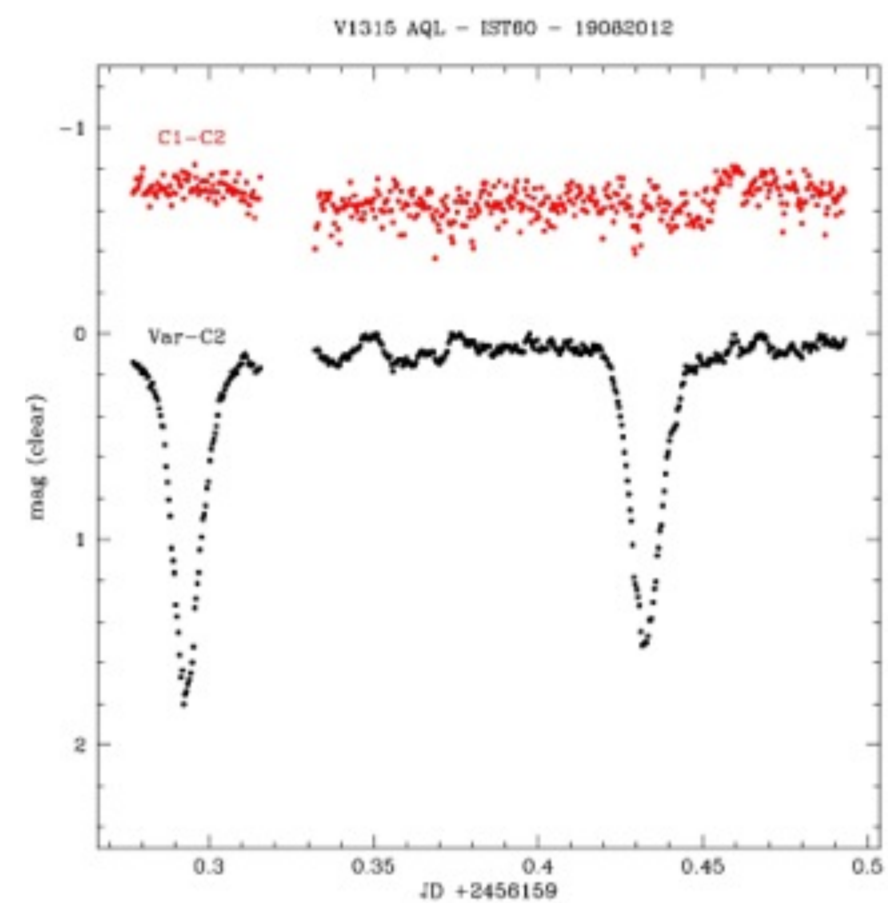
İST40 İle Hangi Değişen Yıldızları Gözlemeliyiz?

Başlangıç olarak, kısa dönemli değişen yıldızların takibini programa alacağız.

- Örten çift yıldızlar (P<=0.5 gün)
- Tutulma gösteren kataklismik değişenler
- delta Scuti türü zonklayanlar







Dönem Değişimi
O-C Grafiği

The appearance of an O-C diagram is strongly dependent on the ephemeris formula used to construct it. Traditional analysis ways of an O-C diagram use basic method listed below (Batten, 1973; Tsessevich, 1973).

1) a linear approximation, where the time of the primary minimum is given by a linear relation:

$$Min\,I = t_0 + P_{orb} \times E$$

2) a quadratic least square fitting, which uses the average period value over the elapsed time interval ($\bar{P}$):

$$(O-C) = 1/2(dP_{orb}/dt)\bar{P}E^2$$

3) which is sometimes combined with a sinusoidal periodic variation.

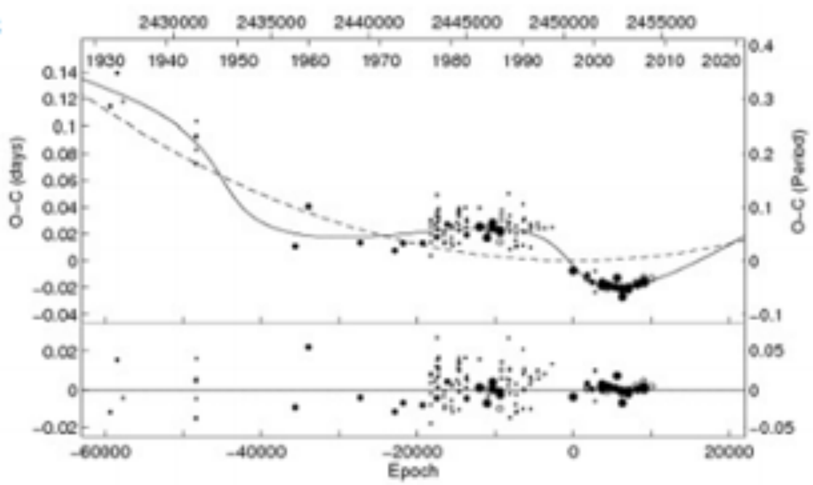
$$Min\,I = t_0 + PE + 1/2(dP/dt)PE^2 + a\sin(2\pi E/P_* + \phi)$$

There were three new ways of O-C diagram treatment proposed in the mid-90s:

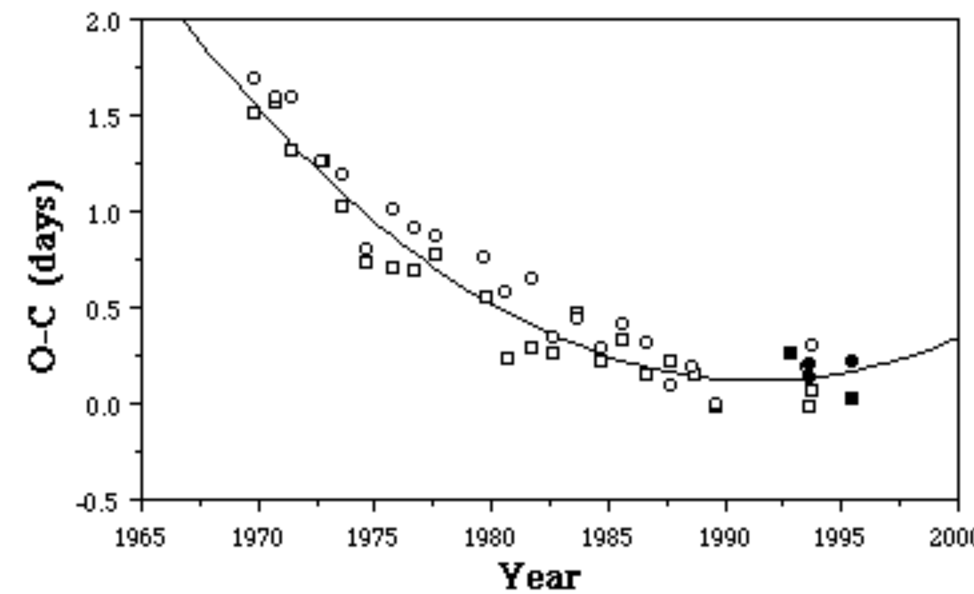
- the higher order polynomial method (HOP), or the first continuous method (Kalimeris et al., 1994);
- the state-space statistical model (SSM), proposed by (Koen, 1996);
- the second continuous method (Jetsu et al., 1997).

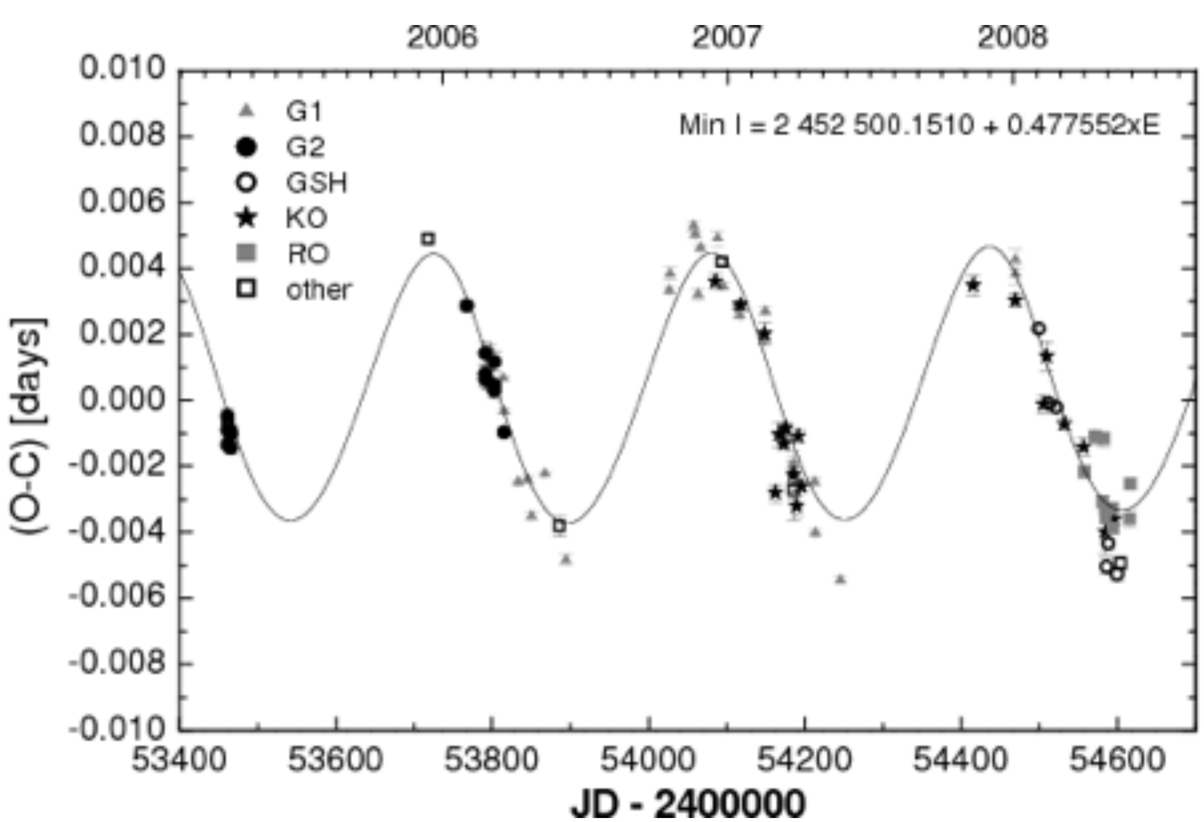
For methods detail, please refer to the following paper: "The (O-C) Diagrams of Eclipsing Binaries: Traditional and New Ways of Treatment" (Rovithis-Livaniou, 2001).

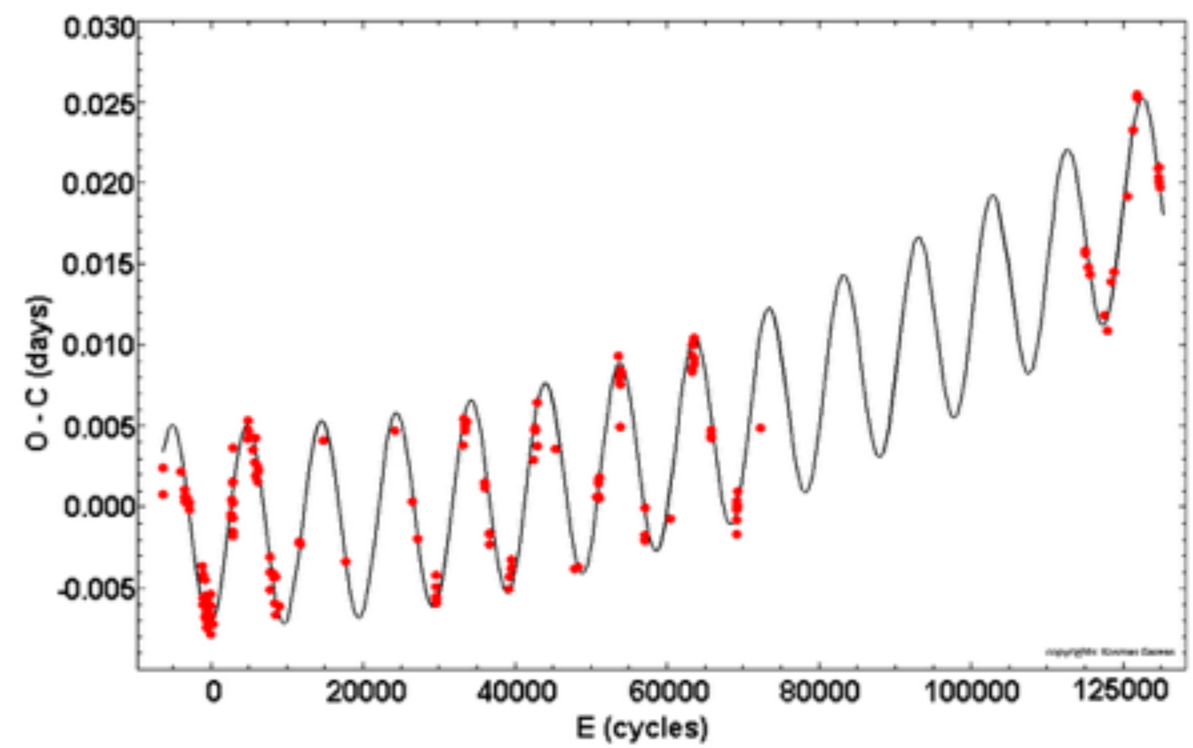
To get even more information on methods for O-C diagrams and errors accounting, please follow the publication: "The O-C Diagram: Basic Procedures" (Sterken, 2005).



The O-C diagram of FZ Ori (upper part), where the solid line represents the theoretical LITE variation caused by a 3rd body and the O-C residuals obtained after the subtraction of LITE (lower part). For details, please refer to (Zasche, Liakos et al., 2009)





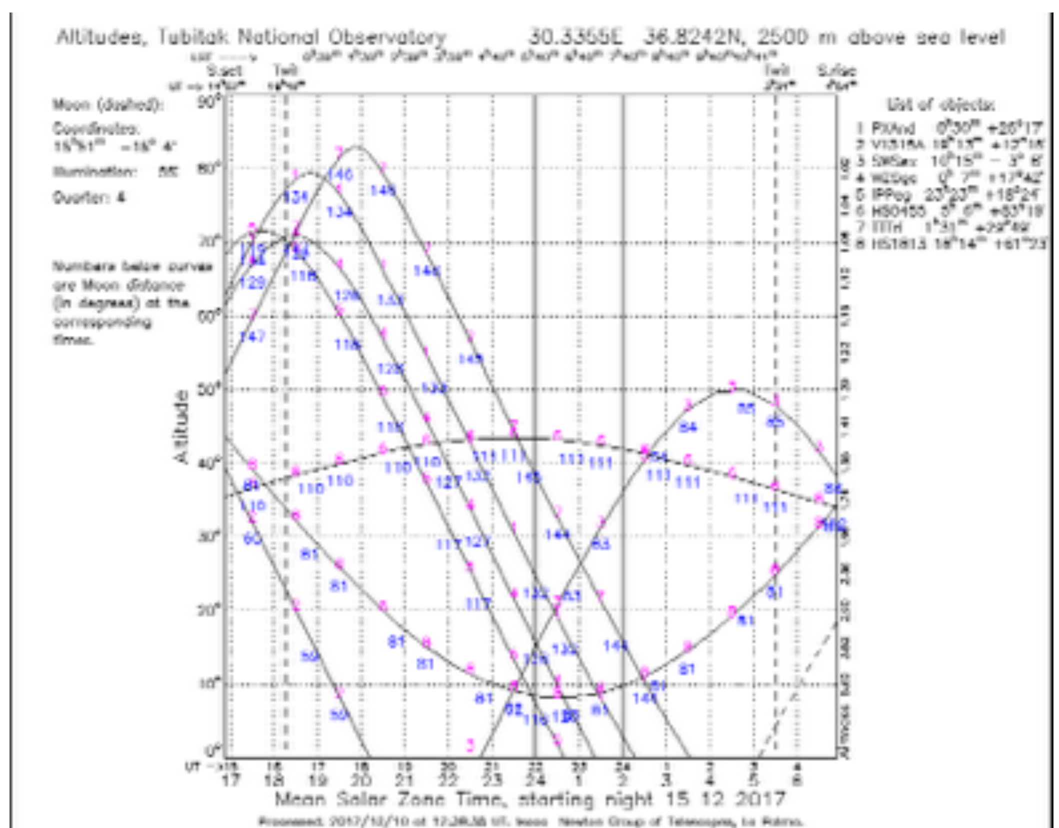


İlk Olarak Yapılması Gerekenler

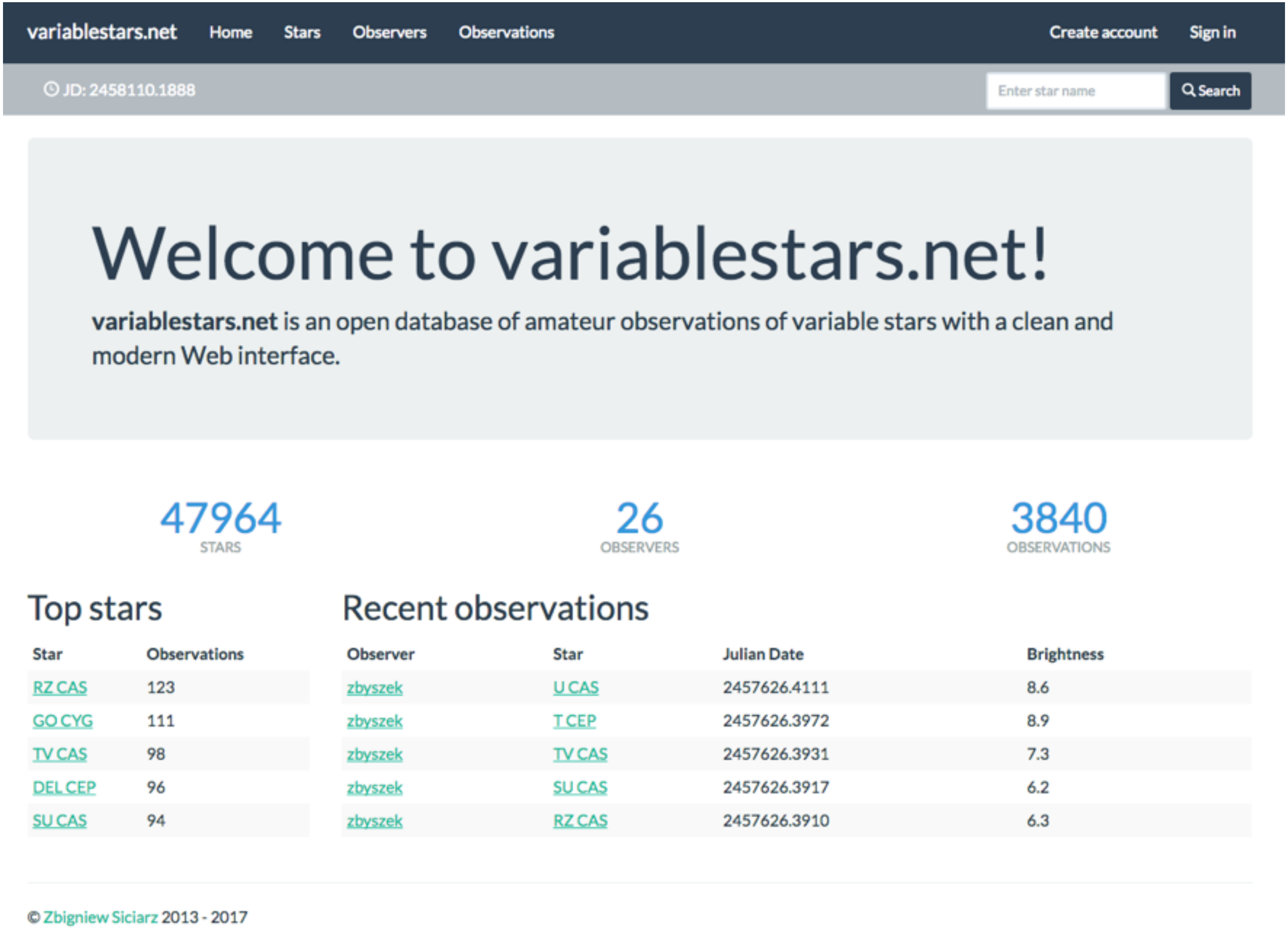
<u>SINAVLARI AKSATMAMAK / İYİ ÇALIŞMAK</u>

İletişim listesi oluşturmak

Gözlem programı oluşturmak
(cisim, gözlenebilirlik)



Gözlenecek Cisim Listesinin Oluşturulması



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26 OBSERVERS

3840 OBSERVATIONS

Top stars

Star	Observations
RZ CAS	123
GO CYG	111
TV CAS	98
DEL CEP	96
SU CAS	94

Recent observations

Observer	Star	Julian Date	Brightness
zbyszek	U CAS	2457626.4111	8.6
zbyszek	T CEP	2457626.3972	8.9
zbyszek	TV CAS	2457626.3931	7.3
zbyszek	SU CAS	2457626.3917	6.2
zbyszek	RZ CAS	2457626.3910	6.3

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DELTA SCUTI AND RELATED STARS*

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An extensive review is given of the current status of our knowledge of the stars in the lower instability strip. Current problems are emphasized. Particular attention is given to the following areas: the confusion concerning naming and the implied astrophysical properties (often erroneous), single and multiple periods, the effect of rotation and metallicism on pulsation, the nature of the so-called dwarf cepheids, and pulsation in Ap stars. Various reports of unusual and strange effects are also discussed with personal, possibly biased judgment on their reality.

Key words: variable stars—δ Scuti stars—dwarf cepheids—pulsation

I. Properties of δ Scuti Stars

Delta Scuti stars are variable stars of spectral type A or F with a pulsation period less than $0^d.3$.[1] In the period range of 0.25 to 0.30 day we find both the δ Scuti and the more evolved RR Lyrae RRc variables, and the distinction between these two groups is not obvious from the period alone. Light amplitudes in V range from a few thousandths of a magnitude to $0^m.8$ with a typical amplitude of $0^m.02$. The existence of δ Scuti stars in clusters such as the Hyades shows that δ Scuti pulsation is a normal and common phenomenon. The δ Scuti instability strip ranges from about $2^m.5$ above the main sequence to below the standard Population I main sequence. Most δ Scuti stars belong to Population I, but a few variables show low metals and high space velocities typical of Population II. Delta Scuti stars form the second most numerous group of pulsators in the Galaxy, after the pulsating white dwarfs.

Many of the δ Scuti stars with amplitudes larger

*One in a series of review articles currently appearing in these *Publications*.

[1]The naming of groups of variable stars is necessarily a controversial subject. It appears prudent to discuss the problem of naming these short-period variables.

Historically, Smith (1955) called the short-period variables dwarf cepheids. His short list included the star δ Sct. Since then, most of the small-amplitude, short-period variables have been called δ Scuti stars after their prototype. This name seems to be almost universally recognized. However, those variables with amplitudes larger than $0^m.3$ (obviously at the time of discovery, since the amplitudes are often variable) have been called either dwarf cepheids of AI Velorum or RRs stars. At times, a variable with an amplitude less than $0^m.3$ has also been considered a dwarf cepheid for unknown reasons. Recent analyses have shown that the division into the two main groups by amplitude alone is astronomically unrigorous and astrophysically unsound. It is essential to combine the two groups or to subdivide the short-period variables in some other, more meaningful way.

What should the combined group of short-period variables be called? One could return to Smith's original suggestion and call all of them *dwarf cepheids*. The name reflects the fact that these stars are the more dwarfish cousins of the cepheids. Some disadvantages of such a scheme are that many of these stars are not dwarfs at all, but giants, and that the term dwarf cepheid has recently been used to denote the large-amplitude variables only. Possible confusion might result.

Eggen in a recent series of papers has wisely avoided the whole problem by calling all these stars (large-amplitude as well as small-amplitude) *ultra-short-period variables*. This name has the advantage of not being burdened by historical associations of certain properties. However, the name is strongly contested from people who study the real ultra-short-period variables such as white dwarfs and cataclysmics with much shorter periods. An improved name of *short-period variable* cannot be used because of its historical association with RR Lyrae stars.

The name *δ Scuti* seems apt since the *GCVS* already calls all of the many small-amplitude variables by that name. The name also has associations of normal-abundance, normal-mass and luminosity, which fits most of the large-amplitude variables as well. The disadvantage is the fact that some variables do have a different abundance and probably are fainter than the normal variables of similar periods.

The name *AI Vel* might also be considered. The primary period of AI Vel was discovered a few years before that of the star δ Sct and AI Vel might take historical precedence. However, Bessell (1969) established the term AI Vel variables to apply to the large-amplitude variables only. Also, the *GCVS* does not use the name.

We adopt the scheme requiring fewest changes. The *GCVS* recognizes both the names δ Scuti and RRs stars to refer to the small-and large-amplitude variables, respectively. Since the distinction can no longer be maintained, we drop one of these two names. Variability surveys indicate that small amplitudes are much more common than large amplitudes by orders of magnitudes: we therefore propose to drop the RRs designation and *call all the variables δ Scuti stars*.

TABLE I

Selected Delta Scuti Stars

HR HD	GCVS Other	PERIOD V AMP	REFS	SP M_V	b-y $(b-y)_o$	m_1 β	c_1 Comments
21 432	β Cas	0.104 0.03	M66	F2IV 1.12	0.216 0.224	0.177 2.709	0.785
114 2628	GN And 28 And	0.070 0.035	B69-3 N69	F0IV 1.36	0.169 0.167	0.165 2.755	0.869
139 3112	θ Tuc	0.049 0.06	CL71 SS76	A4 1.42	0.146 0.098	0.187 2.827	0.984
	CC And	0.125 0.25	LE53 F67	F3IV			
214 4490	XX Psc 59 Psc	0.10 0.04/0	GB72 BW73	A5 0.57	0.165 0.149	0.178 2.773	0.929
238 4818	V526 Cas	0.136 0.025	BG73	gF6 2.32	0.166 0.172	0.216 2.770	0.780
239 4849		0.056 0.02	W77	F0			
242 4919	ρ Phe	0.105 0.04	CS63 SS75	F2III 1.62	0.207 0.203	0.205 2.731	0.789
 6870	BS Tuc	0.065 0.015	E70	A5III 1.99	0.166 0.157	0.132 2.765	0.810 2,5
	SS Psc	0.288 0.43	MR77	A7-F2 0.3	MR77 0.178		 1
401 8511	AV Cet 44 Cet	0.032 0.02	JJ71	F0V 2.12	0.214 0.151	0.205 2.786	0.829
431 9065	WZ Scl	0.090 0.03	D69	F0IV 1.55	0.217 0.199	0.144 2.722	0.764
432 9100	VX Psc 97 Psc	0.136 0.02	B69-3	A4IV 0.40	0.090 0.093	0.166 2.817	1.093 3
 9133	XX Scl	0.045 0.03	D69	F0			
515 10845	VY Psc	0.219 0.02	B69-3	A7n 0.84	0.158 0.140	0.173 2.777	0.979 3,15
 11285		0.063 0.02	W78	F0			
	RV Ari	0.093 0.70	D56				 1
 15165	 BDS 1269A	0.10 0.07	SH76 MB76	 (0.7)	0.197 0.213	0.100 2.706	0.822 2
729 15550	UU Ari 26 Ari	0.080 0.026	B69-3	A9V 1.96	0.155 0.155	0.185 2.777	0.839
	AB Cas	0.058 0.05	T71 TC78				 6
812 17093	UV Ari	0.037 0.02	M67-1 F73	A7IV 2.31	0.135 0.131	0.188 2.804	0.837
 20919	 H 606	0.035 0.01	S78	F0V 2.69	0.207 0.162	0.178 2.775	0.765 10

Tutulma Gösteren CV'ler

The Big List of SW Sextantis Stars (v5.3.0 – Oct 2016)

This is the link to download the Target Characteristics Summary Table

Introduction

The SW Sextantis stars are a sub-class of cataclysmic variables (CVs) that share a number of characteristic observational properties (e.g., transient absorption in their emission line cores that appears at specific orbital phases, single-peaked emission lines rather than the double-peaked lines characteristic of disk-accreting CVs, indications of very high mass transfer rate, etc. – follow this link for a more complete and detailed list of the observational characteristics of the SW Sex stars). Although studied individually for a number of years, the SW Sex stars were first identified as an observationally similar group in the early 1990s.

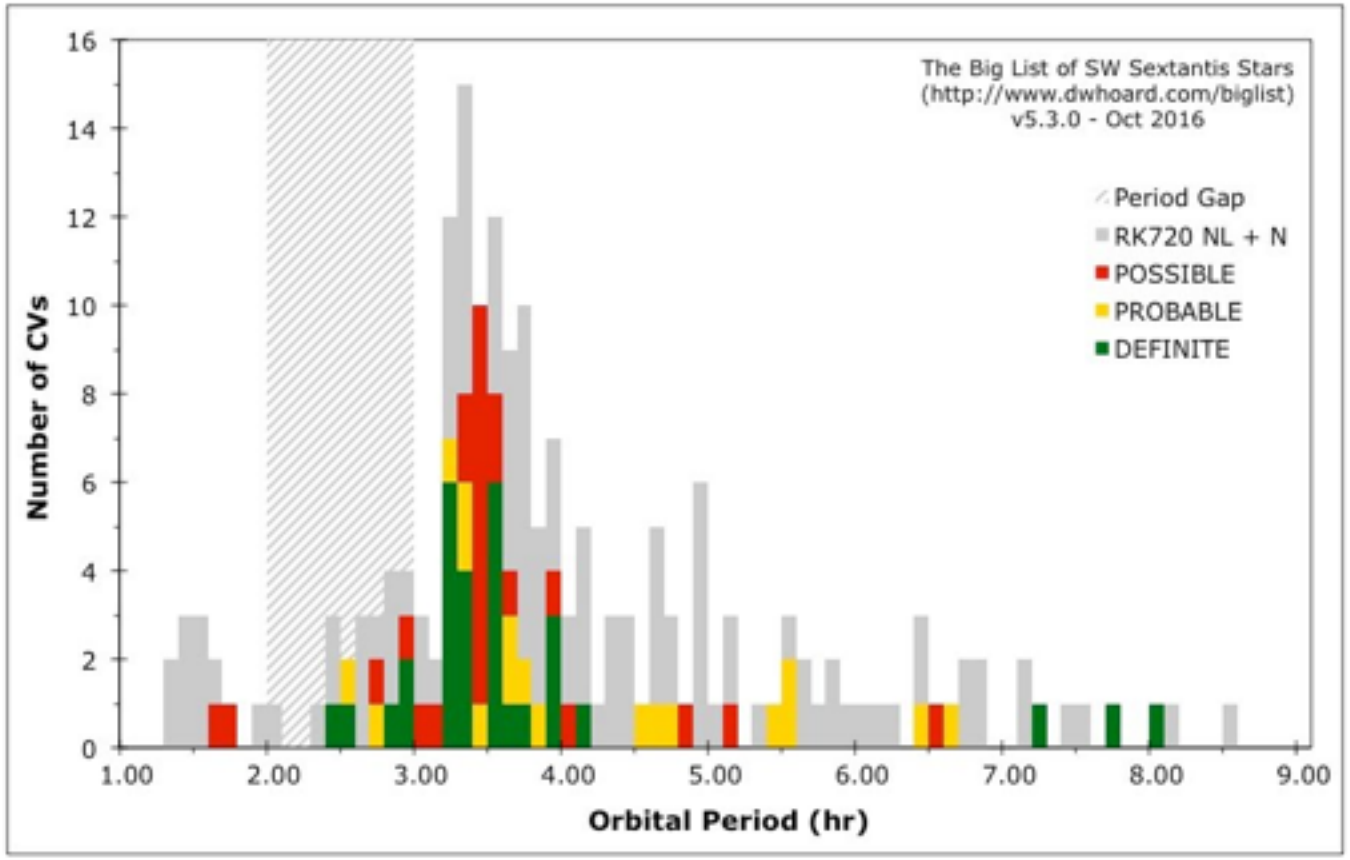
Establishing a complete census of membership in the SW Sex class is a difficult task, as our understanding of the range and possible origins of the SW Sex syndrome has evolved over the past two decades. For example, original defining characteristics of being a high inclination (i.e., eclipsing) CV and having He II λ4686 emission comparable in strength to that of Hβ have been relaxed as it has become apparent that these were likely selection effects that influenced the discovery of the first SW Sex stars. Meanwhile, some recent work has suggested that the SW Sex stars might be the weakest magnetic CVs with the highest mass transfer rates (follow this link for a discussion of the magnetic scenario for the SW Sex stars), while other theories utilize complex accretion disk structural models (e.g., tilted, warped, precessing disks).

Townsley & Gänsicke (2009) make the following interesting statement about the possible origin of the SW Sex syndrome: *"Speculating that high [white dwarf effective temperature] and [mean mass transfer rate] are a common characteristic to all VY Scl/SW Sex stars suggests that these systems represent an exceptional phase in CV evolution. One possible explanation is that these are systems that just evolved into a semi-detached configuration, as the mass transfer goes through a short peak during turn-on (e.g., D'Antona et al. 1989), and that CVs are preferentially born within the 3-4 hr period range, which would be the case if the initial mass distribution is peaked toward equal masses in the progenitor MS binaries (de Kool 1992)."*

Consequently, determining the full census of the SW Sex stars is important, as the SW Sex syndrome appears to be widespread among the CV population, and possibly has important implications related to the secular evolution of CVs. A full understanding of the SW Sex syndrome will likely depend on a complete census of the number and range of CVs that are afflicted with it. To this end, I have compiled The Big List of SW Sextantis Stars. It is not necessarily intended to be the definitive SW Sex star census, but it is exhaustive in the sense that it contains all CVs that have been linked to the SW Sex stars in published sources.

The Big List of SW Sextantis Stars is complete to the best of my knowledge (as of the version date listed above). During each update of the Big List, I locate new SW Sex stars by running a NASA-ADS search, with a publication window starting 1 month prior to the last Big List update, for text strings "SW Sex" and "cataclysmic" in paper abstracts, cross-correlated with a full-text ADS search for just "SW Sex" anywhere in the body of the paper. If you know of a new SW Sex star that I've missed, please email its name or other identifying information to me, and I'll add it to the list. Some of the information shown here is unavoidably subjective (mainly the assessment of a CV as a Definite, Probable, or Possible SW Sex star). If you disagree with any of my assessments, you can also email me and I will consider changing the appropriate entry, based on your persuasiveness!

Orbital Period Distribution of the SW Sex Stars

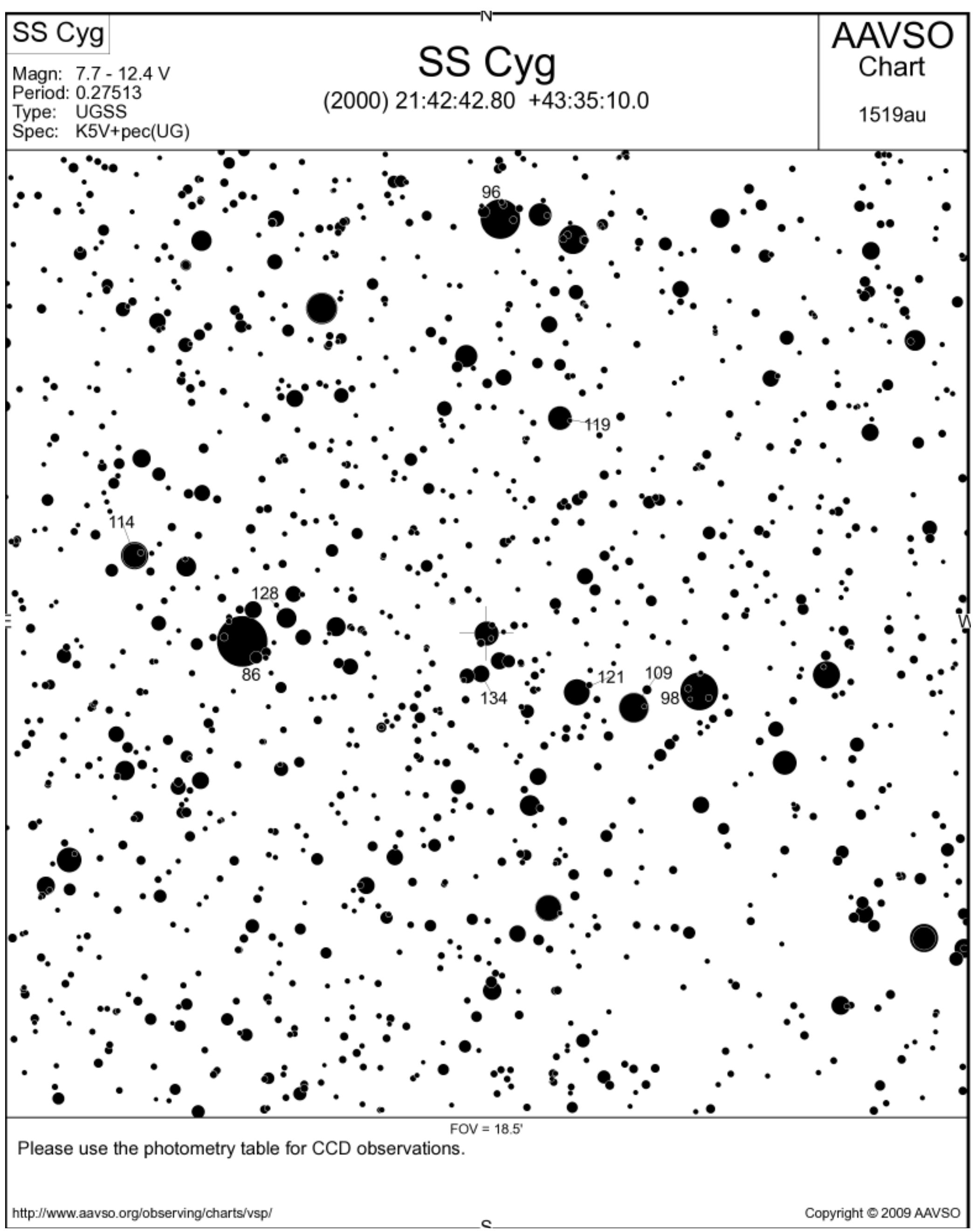


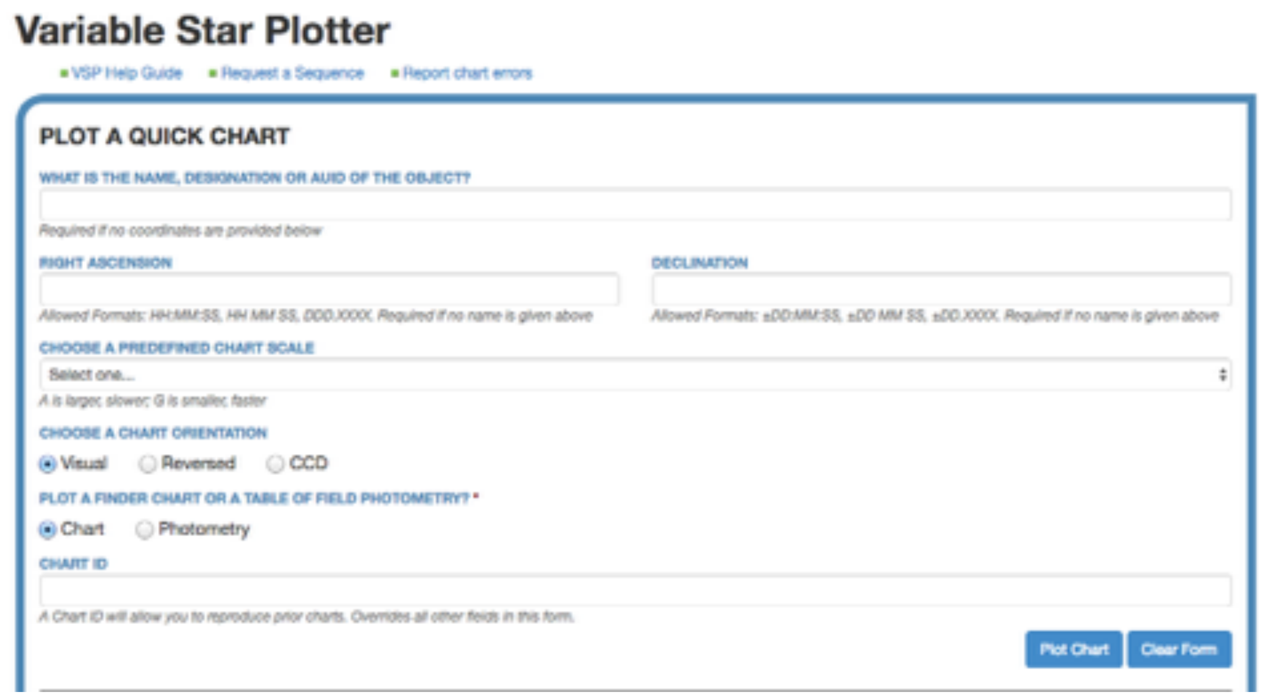
http://www.dwhoard.com/biglist

Gözleme Yönelik Hazırlıklar

Gözlenecek Alanın Haritasının Oluşturulması

AAVSO Variable Star Plotter





Öğrenmemiz Gerekenler

CCD Ön İndirgeme Adımları

Görüntülerin Hizalanması

CCD Görüntülerine Astrometri Uygulanması

Minimum / Maksimum Zamanlarının Belirlenmesi

Dönem Analizi

JD ve HJD Hesaplama
Sinyal / Gürültü Oranı
Atmosferik Sönümleme - Hava Kütlesi Hesabı
Fark ve Mutlak Fotometri - Standart Sisteme Dönüşüm