

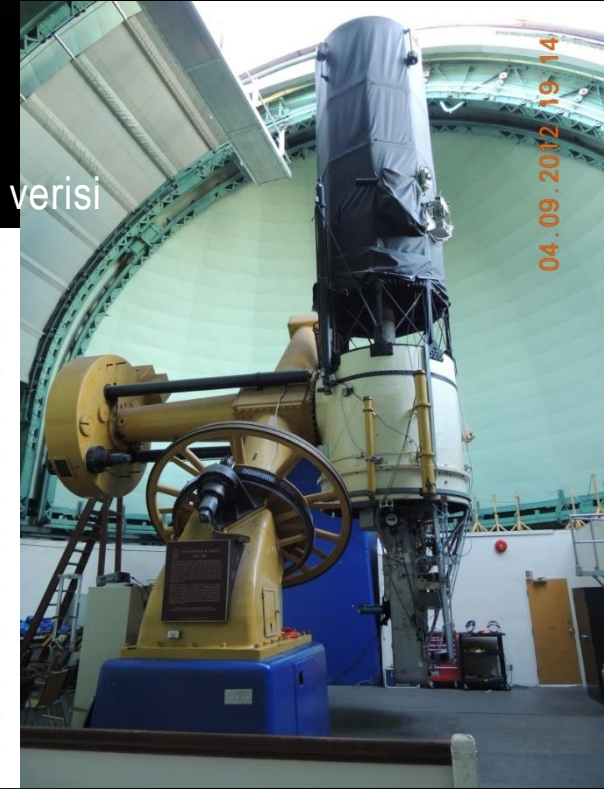
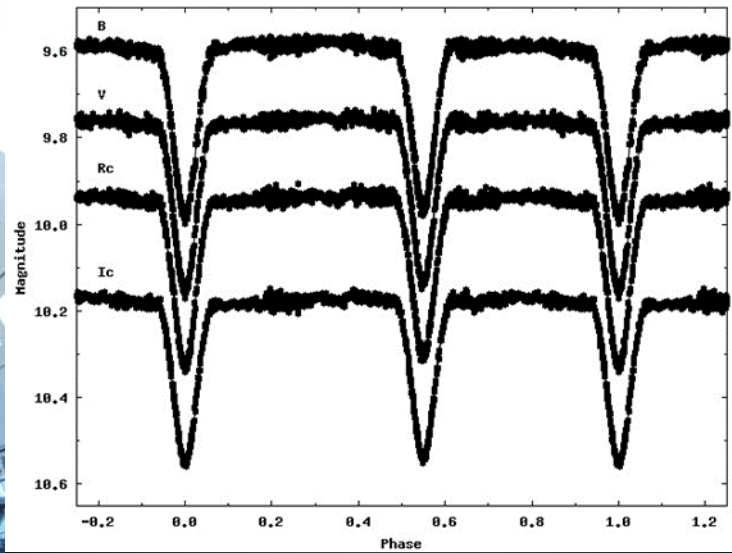
# Genç Ayrık Çift Yıldız HD 350731'in Doğası

Fahri ALİÇAVUŞ

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# ÖNCEKİ ÇALIŞMALAR VE GÖZLEMLER

- HD350731,  $V=9^m.60$ , A0
- Nesterov ve ark. (1995)
- Otero ve ark. (2004), Kleidis ve ark. (2008)
- Ulupınar gözlemevi 11 gece, BVR çok renk ışık ölçümü
- Dominion Astrofizik Gözlemevi - 21 adet orta çözünürlükte tayf verisi



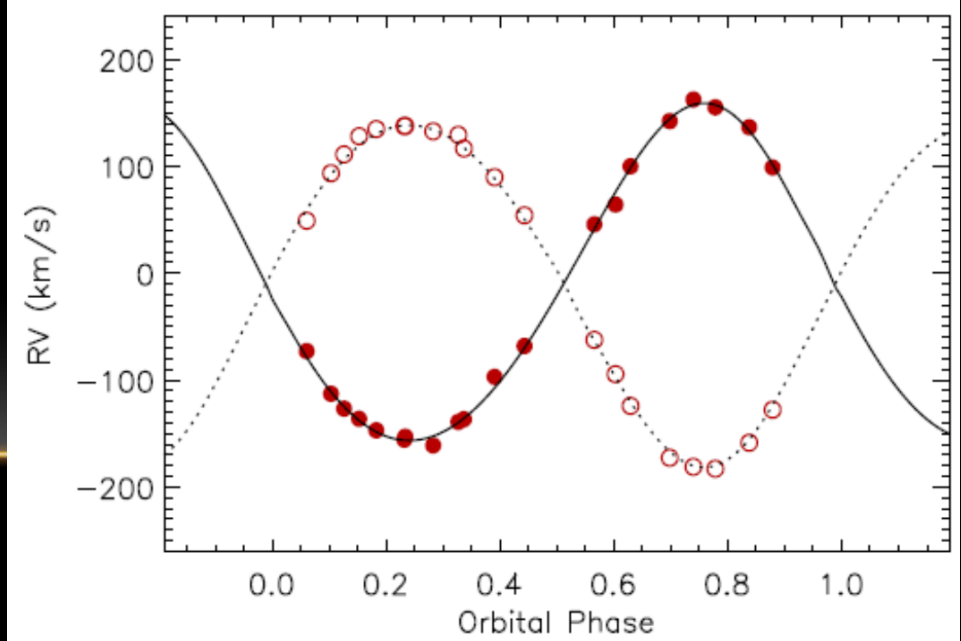
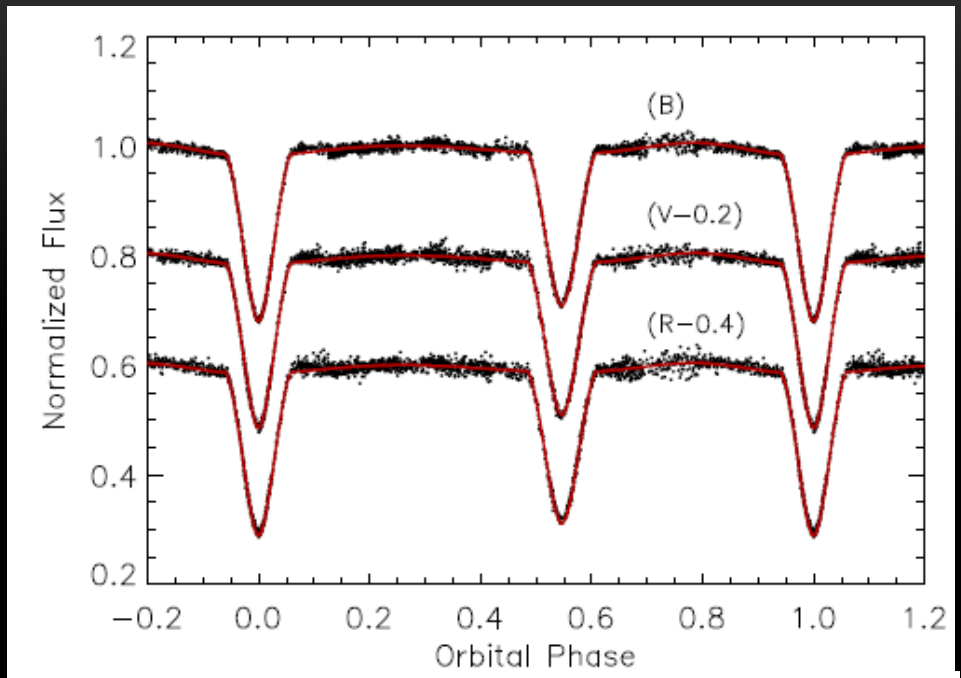
# DIKINE HIZLAR VE YÖRÜNGE ÇÖZÜMÜ

2450000-HJD	Evre	RV1 (kms <sup>-1</sup> )	Hata (kms <sup>-1</sup> )	RV2 (kms <sup>-1</sup> )	Hata (kms <sup>-1</sup> )
6173.8976	0.0773	-72.88	5.81	49.06	8.10
6152.7108	0.1200	-112.80	5.97	93.46	7.07
6152.7482	0.1429	-126.68	6.52	111.07	7.76
6147.8861	0.1694	-136.19	6.22	128.07	7.04
6152.8407	0.1995	-146.92	6.80	134.76	8.05
6175.8132	0.2488	-155.62	6.75	137.62	8.46
6152.9240	0.2505	-152.90	6.56	137.68	9.21
6175.8962	0.2996	-161.02	6.76	132.64	9.37
6180.8738	0.3437	-139.09	6.18	129.36	6.18
6149.8223	0.3536	-136.54	6.42	116.57	8.96
6149.9104	0.4074	-97.01	6.62	89.73	7.05
6172.8880	0.4598	-68.09	6.48	54.10	7.41
6177.8676	0.5052	-10.87	0.42		
6146.9266	0.5826	45.70	5.17	-62.32	7.71
6174.7848	0.6199	64.17	6.82	-94.44	7.20
6151.9360	0.6462	99.97	6.53	-124.10	7.11
6148.7783	0.7151	142.22	7.75	-172.57	7.81
6148.8464	0.7567	162.35	7.07	-181.08	7.44
6148.9094	0.7952	155.07	6.86	-182.86	8.52
6171.8986	0.8548	136.49	9.98	-158.49	8.15
6176.8712	0.8958	98.84	8.84	-127.76	6.84

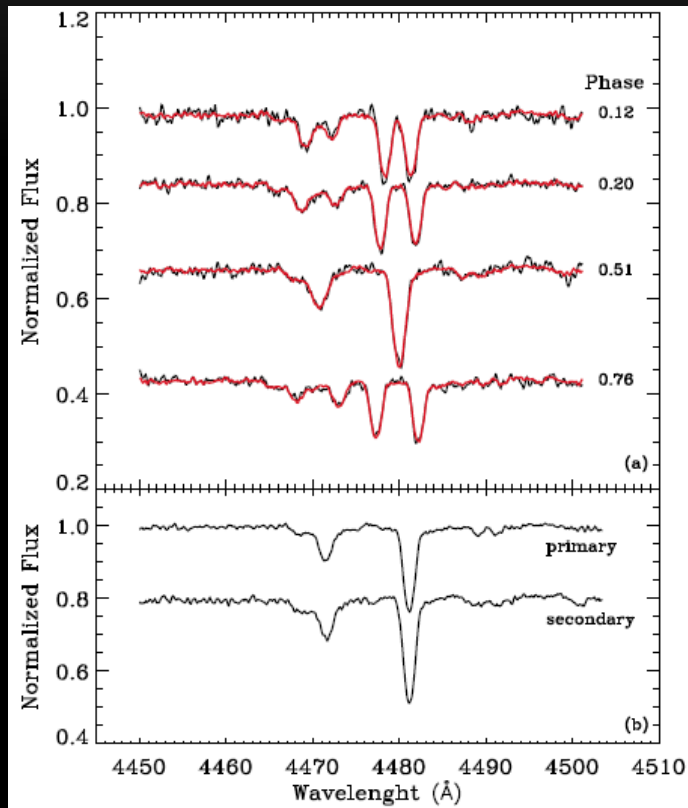
Parameter	Value
$T_0$ (HJD)	2454631.4603 <sup>1</sup>
$P_{orb}$ (day)	1.635135 <sup>1</sup>
$V_\gamma$ (km s <sup>-1</sup> )	-10.4 ± 0.7
$K_1$ (km s <sup>-1</sup> )	157.2 ± 1.3
$K_2$ (km s <sup>-1</sup> )	162.7 ± 1.3
$e$	0.077 ± 0.007
$\omega$ (degree)	23.5 ± 2.3
$a_1 \sin i$ (10 <sup>6</sup> km)	3.52 ± 0.04
$a_2 \sin i$ (10 <sup>6</sup> km)	3.64 ± 0.04
$M_1 \sin^3 i$ (M <sub>⊙</sub> )	2.79 ± 0.05
$M_2 \sin^3 i$ (M <sub>⊙</sub> )	2.70 ± 0.05
$q$ (=M <sub>2</sub> /M <sub>1</sub> )	0.966 ± 0.015

# EŞ ZAMANLI ÇÖZÜM

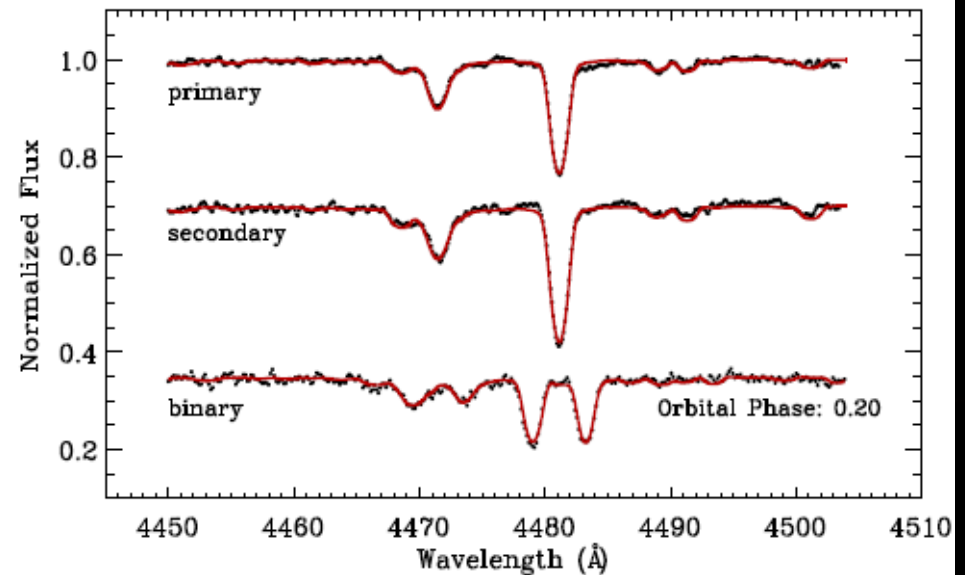
Parameter	W-D solution
$a$ ( $R_{\odot}$ )	$10.43 \pm 0.02$
$V_{\gamma}$ ( $\text{km s}^{-1}$ )	$-10.1 \pm 0.4$
$e$	$0.077 \pm 0.006$
$\omega$ (degree)	$19.90 \pm 0.12$
$i$ ( $^{\circ}$ )	$82.16 \pm 0.03$
$T_1$ (K)	$11840^a$
$T_2$ (K)	$11575 \pm 20$
$\Omega_1$	$5.920 \pm 0.015$
$\Omega_2$	$6.210 \pm 0.025$
Phase shift	$0.0022 \pm 0.0001$
$q$ ( $=M_2/M_1$ )	$0.969 \pm 0.003$
$L_1 / (L_1 + L_2) - B$	$0.552 \pm 0.003$
$L_1 / (L_1 + L_2) - V$	$0.551 \pm 0.002$
$L_1 / (L_1 + L_2) - R$	$0.550 \pm 0.002$
$L_2 / (L_1 + L_2) - B$	$0.448 \pm 0.002$
$L_2 / (L_1 + L_2) - V$	$0.449 \pm 0.002$
$L_2 / (L_1 + L_2) - R$	$0.450 \pm 0.002$
$r_1$ (mean)	$0.2026 \pm 0.0004$
$r_2$ (mean)	$0.1869 \pm 0.0005$



# BİLEŞENLERİ TAYFSAL AYIRMA VE MODEL ATMOSFER

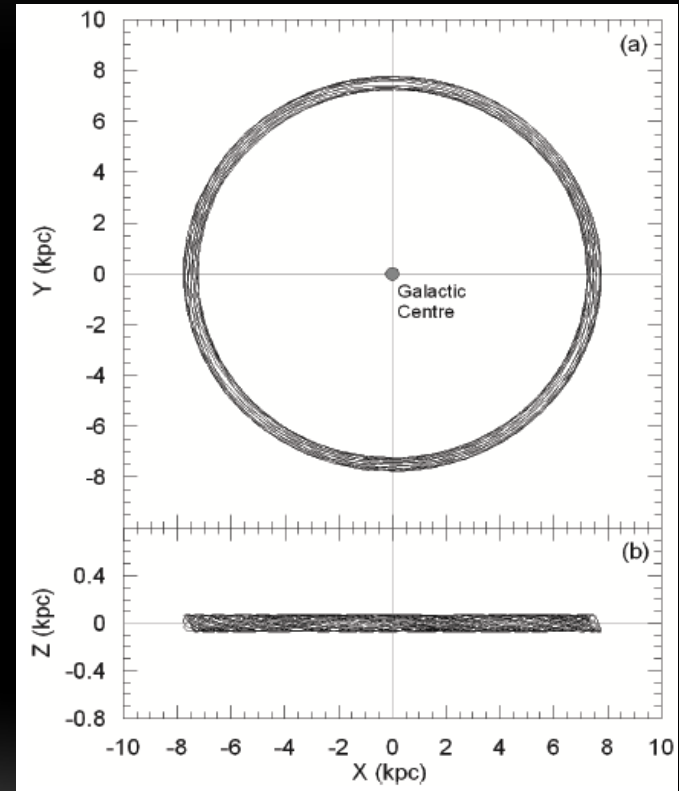


Parameter	Primary	Secondary
$T_{eff}$ (K)	$11840 \pm 270$	$11500 \pm 300$
$\log g$ (cgs)	$4.40 \pm 0.15$	$4.51 \pm 0.20$
$v \sin i$ ( $\text{km s}^{-1}$ )	$69.3 \pm 0.9$	$60.4 \pm 1.2$
$v_{mic}$ ( $\text{km s}^{-1}$ )	$3.8 \pm 0.8$	$4.5 \pm 0.9$
Mg II	-4.52	-4.31
He II	-1.10	-0.89
Ti I	-7.27	-7.02
Fe II	-4.54	-4.54

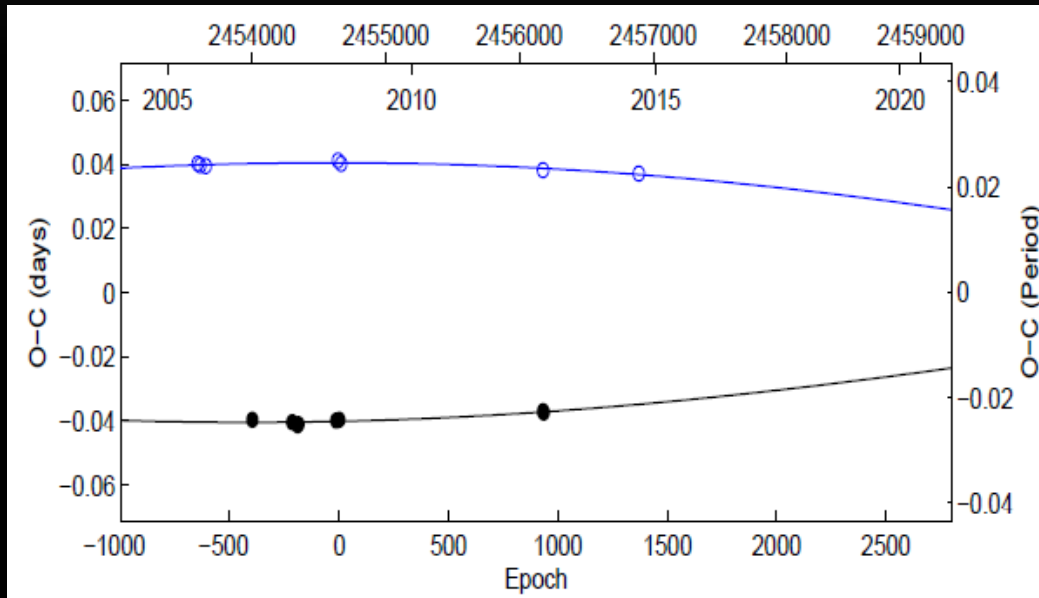


# KINEMATİK ÖZELİKLER

- $S_t = 11.46 \pm 3.17 \text{ km s}^{-1}$
- $(U, V, W) = (8.50, 13.38, 6.49) \text{ km s}^{-1}$
- $R_{\min}, R_{\max}, 7.25 \text{ ve } 7.78 \text{ kpc}$
- $Z_{\max} = 70 \text{ pc}$
- $e_p = 0.04, e_v = 0.01$
- Genç ince disk üyesi (Nbody-Girardi ve Van Altena 1999)



# EKSEN DÖNMESİ ANALİZİ

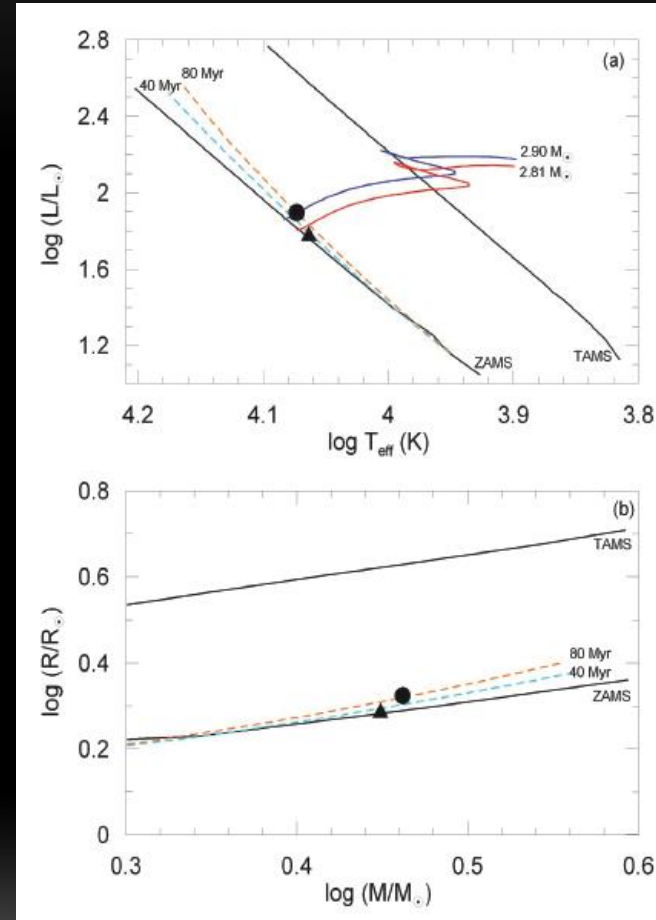


Parameter	Value
$T_0$ (HJD)	$2454651.5002 \pm 0.0111$
$P_s$ (day)	$1.63513 \pm 0.00002$
$e$	$0.078 \pm 0.028$
$\omega$ (degree)	$3.8 \pm 6.3$
$d\omega/dt$ (degree cycle $^{-1}$ )	$0.0173 \pm 0.0131$
$U$ (yr)	$93 \pm 58$
$P_a$ (day)	$1.63521 \pm 0.00003$

# BİLEŞENLERİN MUTLAK PARAMETRELERİ

Parameter	Primary	Secondary
Mass ( $M_{\odot}$ )	$2.90 \pm 0.10$	$2.81 \pm 0.11$
Radius ( $R_{\odot}$ )	$2.11 \pm 0.01$	$1.95 \pm 0.01$
Temperature (K)	$11840 \pm 270$	$11575 \pm 300$
$\log L (L_{\odot})$	$1.90 \pm 0.05$	$1.79 \pm 0.06$
$\log g$ (cgs)	$4.25 \pm 0.02$	$4.30 \pm 0.01$
Orbital period (day)	$1.63513 \pm 2 \times 10^{-5}$	
Orbital Separation ( $R_{\odot}$ )	$10.43 \pm 0.02$	
Mass ratio	$0.969 \pm 0.003$	
Systemic velocity ( $\text{km s}^{-1}$ )	$-10.1 \pm 0.4$	
Distance (pc)	$578 \pm 30$	
$V$ (mag)	$9.60^a$	
$(B-V)_0$ (mag)	$-0.11 \pm 0.02$	$-0.10 \pm 0.02$
$M_{Bol}$ (mag)	$0.01 \pm 0.11$	$0.29 \pm 0.12$
$BC$ (mag)	$-0.63^b$	$-0.57^b$
$M_V$ (mag)	$0.64 \pm 0.11$	$0.86 \pm 0.12$
Measured $v \sin i$ ( $\text{km s}^{-1}$ )	$69.3 \pm 1.0$	$60.4 \pm 1.2$
Synchronous $v \sin i$ ( $\text{km s}^{-1}$ )	$64.5 \pm 0.1$	$59.8 \pm 0.1$
Age (Myr)	$\sim 60$	

<sup>a</sup>: SIMBAD Database, <sup>b</sup>: Sung et al. (2013)





## SONUÇ - TARTIŞMA

- B8V+B8V, Baş bileşenin dönme hızı senkronizasyon hızından biraz daha yüksek,
- Yaklaşık güneş kompozisyonunda, Yolaş bileşende He, Mg ve Ti bollukları güneş kompozisyonunun biraz daha üzerinde.
- Enberi noktasının yıllık değişim hızı yaklaşık 3.9 derece, Relativistik katkı yüzde 7.3,
- Gözlenen iç yapı sabiti  $\log k_{2,obs} = -2,32$ , beklenen teorik değer ise -2,28
- 60 My yaşında ve Genç ince-disk üyesi,

- Eksen dönmesinin daha detaylı incelenebilmesi için minimum zamanlarının takibi,
- Bileşenlerin kimyasal yapısının daha iyi anlaşılabilmesi için yüksek çözünürlüklü ve geniş dalgaboyu aralığında tayfsal gözleme ihtiyaç vardır.

TEŞEKKÜRLER 😊

Bu çalışma Tübitak (no: 111T224) ve Herzberg Astrofizik Enstitüsü tarafından desteklenmiştir