

Tabbyn tähti - KIC 8462852

Mysteeritähden havainnot

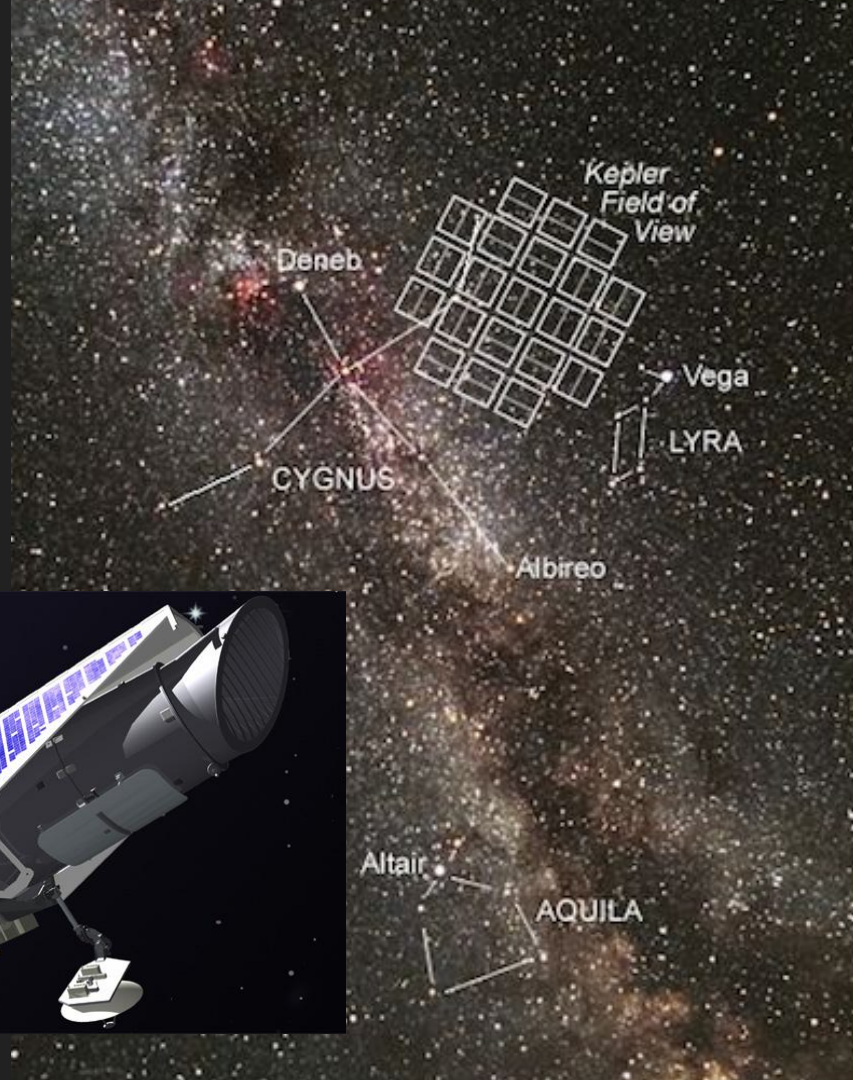
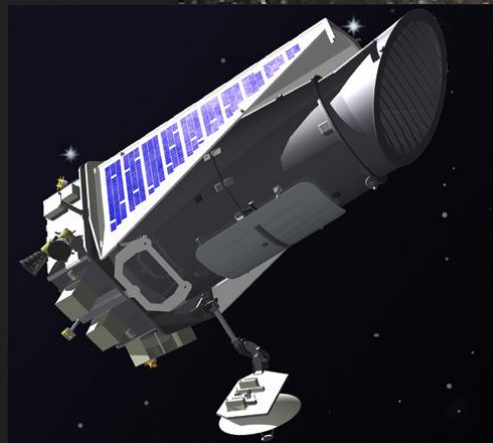
Arto Oksanen

Kepler

NASAn eksoplaneettojen
etsimiseen erikoistunut
avaruusteleskooppi.

Havaitsi 150 tuhatta tähteä
yhtäjaksoisesti 4 vuoden ajan.

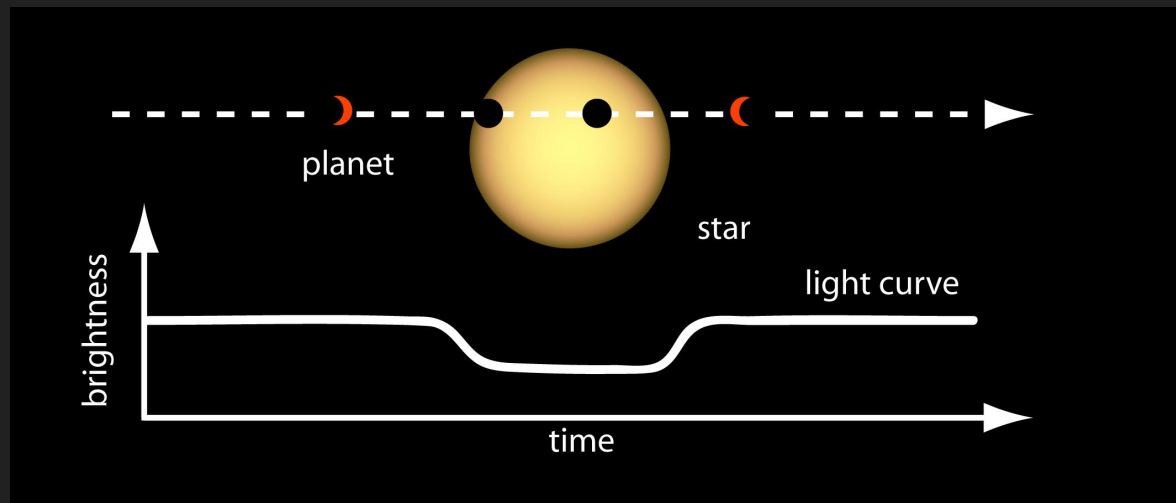
Löysi satoja eksoplaneettoja ns.
ylikulkumenetelmän avulla.



Eksoplaneetan ylikulku

Planeetan ylikulku aiheuttaa pienen pimennyksen (prosentti tai pienempi).

Pimennys toistuu kerran kierroksen aikana.



KIC 8462852

Tähdistö: Joutsen

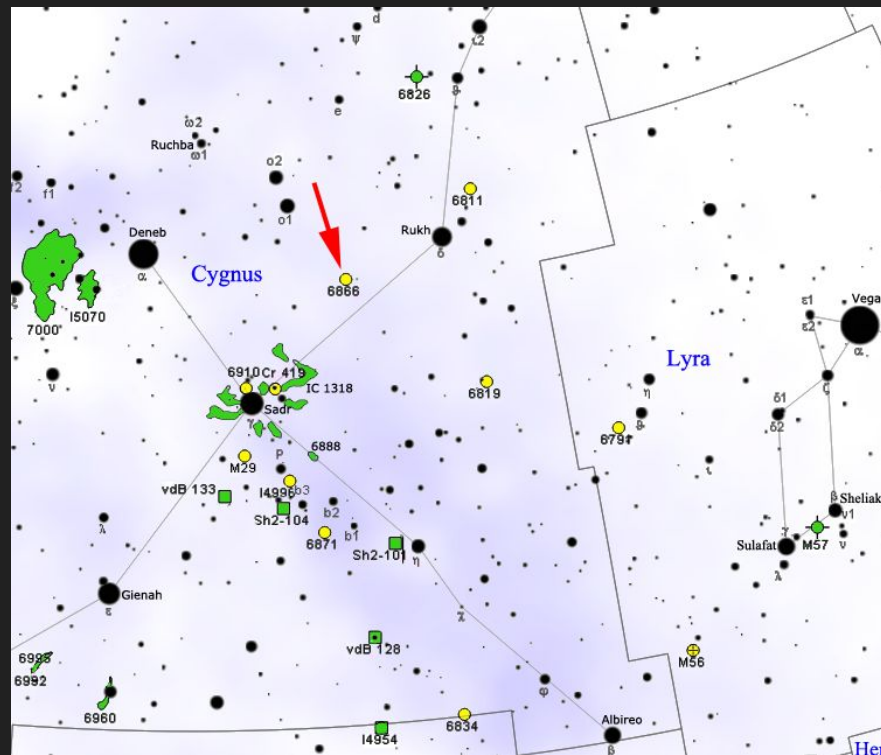
RA: 20h 06m 15.457s

Dec: $+44^{\circ} 27' 24.61''$

Magnitudi (V): $+11.705 \pm 0.017$

Etäisyys: 1200 vv

“Tabbyn tähti” Tabetha Boyajianin mukaan.



Planet Hunters X.

KIC 8462852 – Where’s the flux? ^{∗†}

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D. Fabrycky⁴, D. A. Fischer¹, D. Gandolfi^{5,6}, G. M. Kennedy⁷, H. Korhonen^{8,9}, M. C.
Liu¹⁰, A. Moor¹¹, K. Olah¹¹, K. Vida¹¹, M. C. Wyatt⁷, W. M. J. Best¹⁰, J. Brewer¹,
F. Ciesla¹², B. Csák¹³, H. J. Deeg^{14,15}, T. J. Dupuy¹⁶, G. Handler¹⁷, K. Heng¹⁸, S. B.
Howell¹⁹, S. T. Ishikawa²⁰, J. Kovács¹³, T. Kozakis²¹, L. Kriskovics¹¹, J. Lehtinen²², C.
Lintott²³, S. Lynn²⁴, D. Nespral^{14,15}, S. Nikbakhsh^{22,25}, K. Schawinski²⁶, J. R. Schmitt¹,
A. M. Smith²⁷, Gy. Szabo^{11,13,28}, R. Szabo¹¹, J. Viuhö²², J. Wang^{1,29}, A. Weiksnar²⁰, M.
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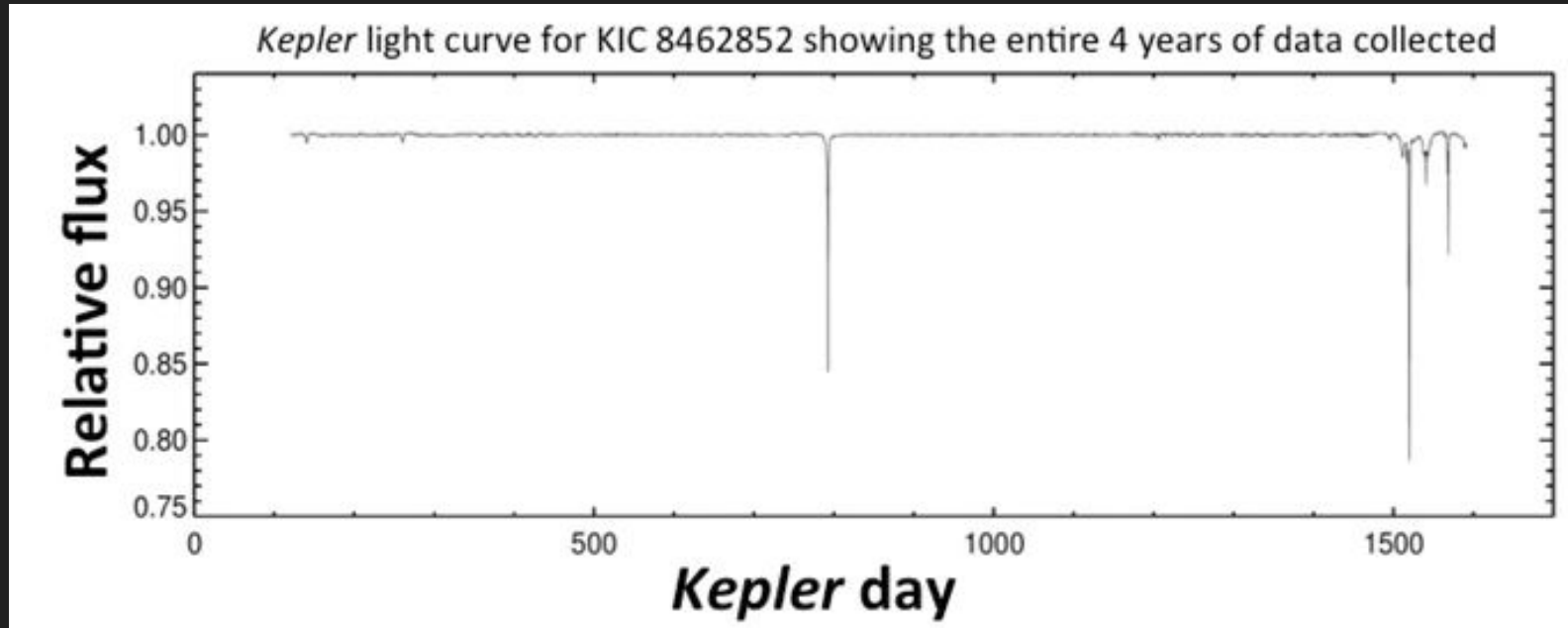
¹³ELTE Gothard Astrophysical Observatory, H-9704 Szombathely, Szent Imre herceg út 112, Hungary

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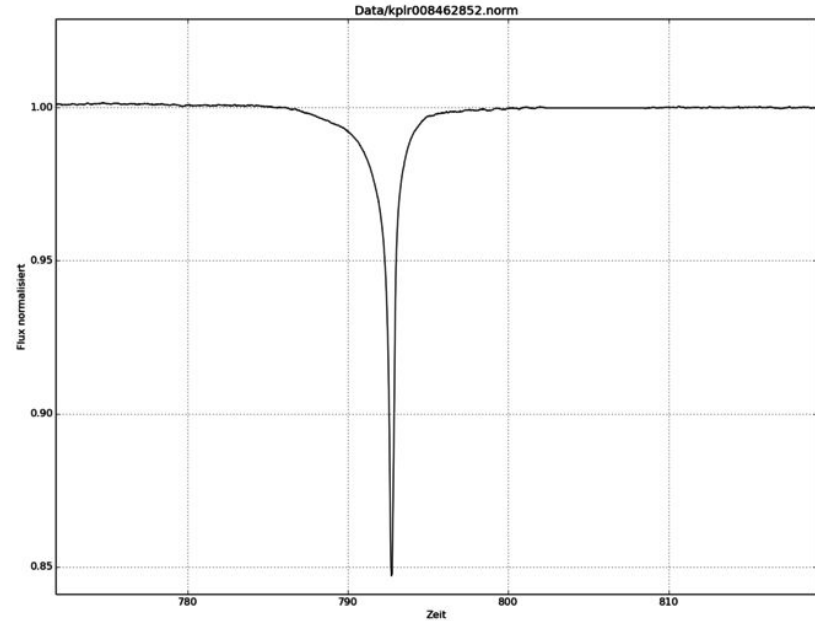
¹⁶The University of Texas at Austin, Department of Astronomy, 2515 Speedway C1400, Austin, TX 78712, USA

KIC 8462852 - Keplerin kaikki havainnot



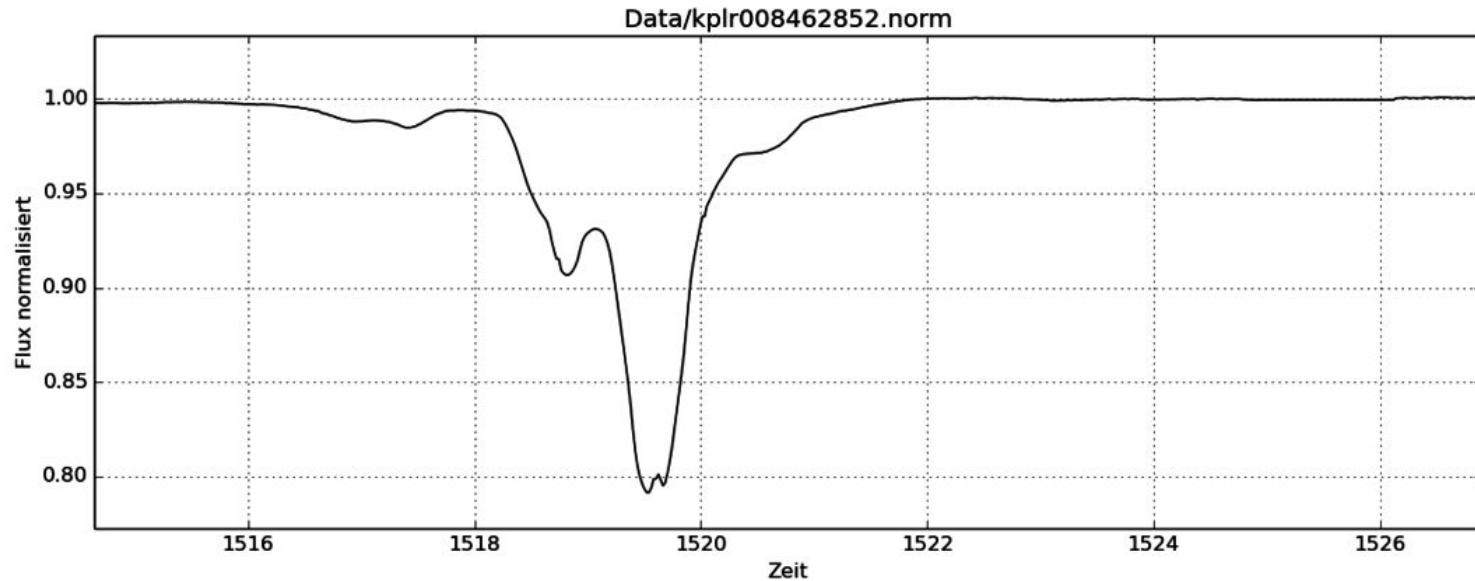
Keplerin havainnot

5 March 2011 (Day 792 of Kepler observations)



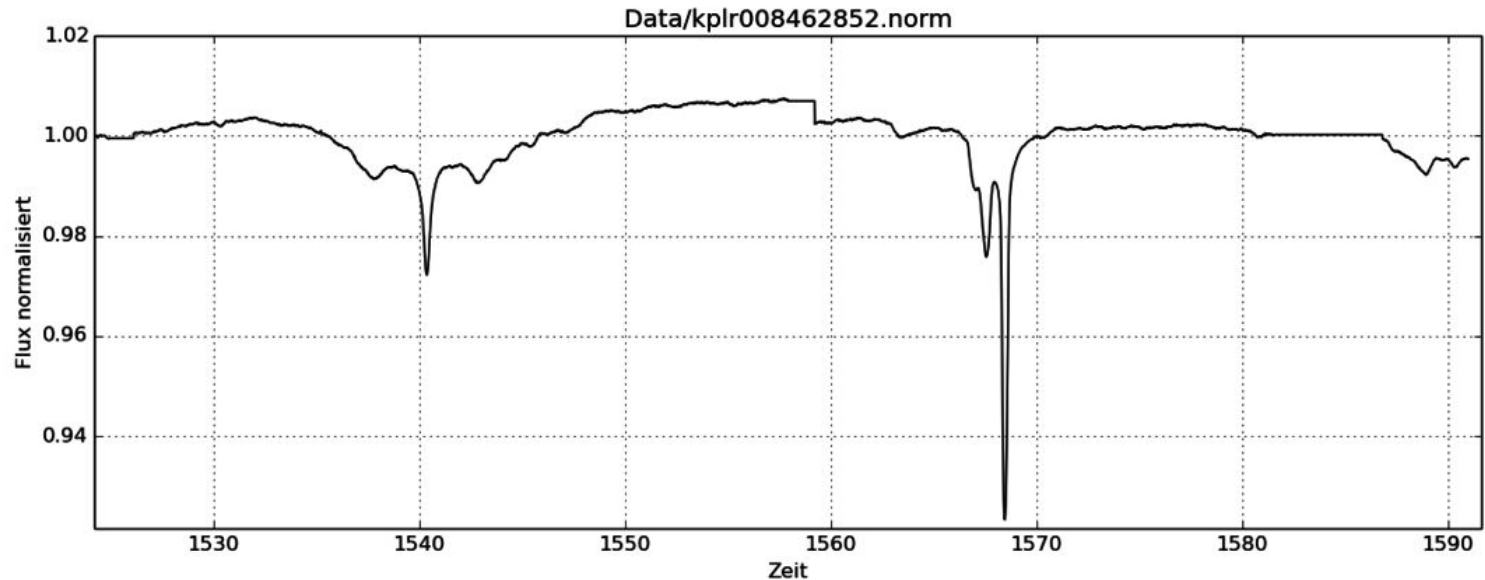
Keplerin havainnot

28 February 2013 (Day 1519 of Kepler observations)



Keplerin havainnot

17 April 2013 (Day 1568 of Kepler observations)

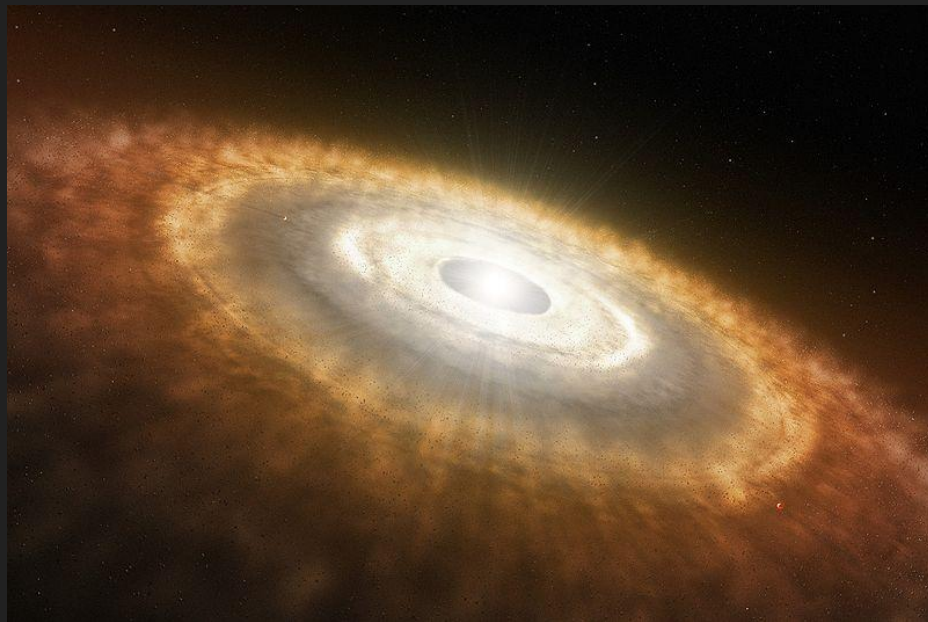


Protoplanetaarinen kiekko?

Selittää kyllä ajallisesti pitkän ja epäsymmetrisen himmenemisen.

Runsaan pölyn olisi pitänyt näkyä infrapunahavainnoissa.

Tähti on myös spektriluokan perusteella pääsarjavaiheessa.



Planeettojen törmäys?

Mahdollinen skenaario, mutta törmäykset ovat hyvin harvinaisia.

Pölyn (jos on paljon) olisi pitänyt näkyä infrapunahavainnoissa.

Tästä vielä eksoottisempi selitys on “kuolontähden räjäyttämä planeetta”.



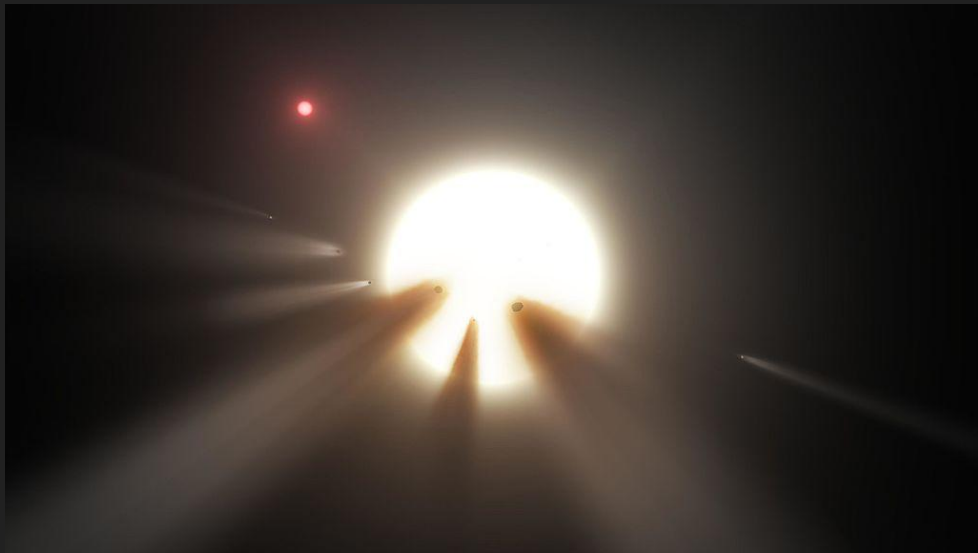
Komeettaparvi?

Usean komeetan (tai useaan osaan hajonneen jättikomeetan) aiheuttama himmeneminen.

Komeetat ovat pieniä ja niiden pyrstöt ovat harvoja (optisesti läpinäkyviä), joten tarvittaisiin satoja komeettoja tähden eteen.

Pimennys ei välttämättä toistu pitkään aikaan.

Tämä on tieteellisen löytöartikkelin tarjoama todennäköisin selitysmahdollisuus.



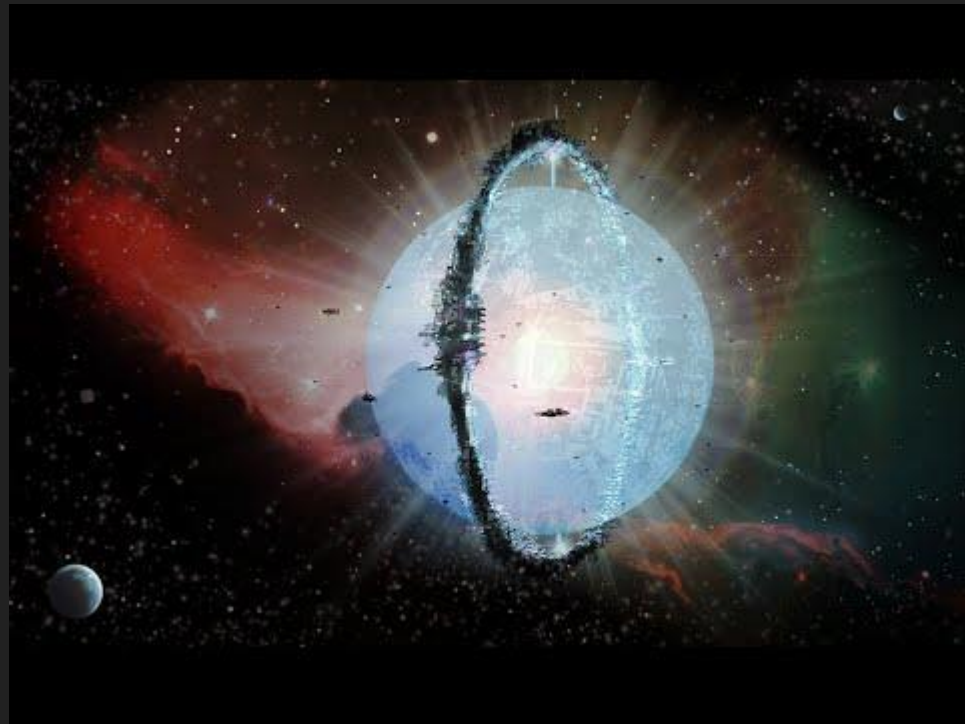
Vieras sivilisaatio?

Vieraan supersivilisaation rakentama aurinkokeräin on saanut mediassa eniten huomiota.

Jos sivilisaatio käyttää paljon energiaa sen pitäisi näkyä lämpösäteilynä. Tätä ei ole kuitenkaan havaittu.

Ehkä on vasta rakenteilla?

Periaatteessa mahdollinen selitys.



Jotain muuta?

????

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American Association of Variable Star Observers

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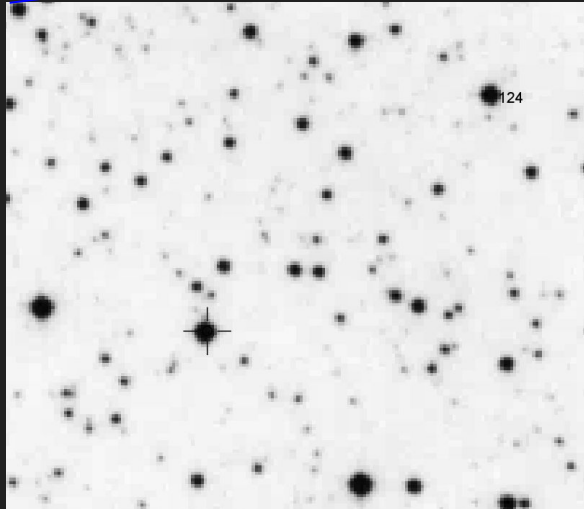
[Home](#) [Print This Page](#)

Alert Notice 532: Observations requested for KIC 8462852

October 20, 2015: The AAVSO requests time-series observations of the enigmatic variable object **KIC 8462852** beginning immediately and continuing through at least the end of the current observing season. The star is relatively bright ($V=11.88$) and shows aperiodic dips of a few tenths of a magnitude, the causes of which are unknown. The object is not known to be a close binary or a young stellar object, and there are no other typical indicators of circumstellar material such as infrared emission. More observations are requested to further characterize the star's variability.

Etsintäkartta

AAVSO on tehnyt hyvät etsintäkartat ja valinnut sopivia vertailutähtiä.



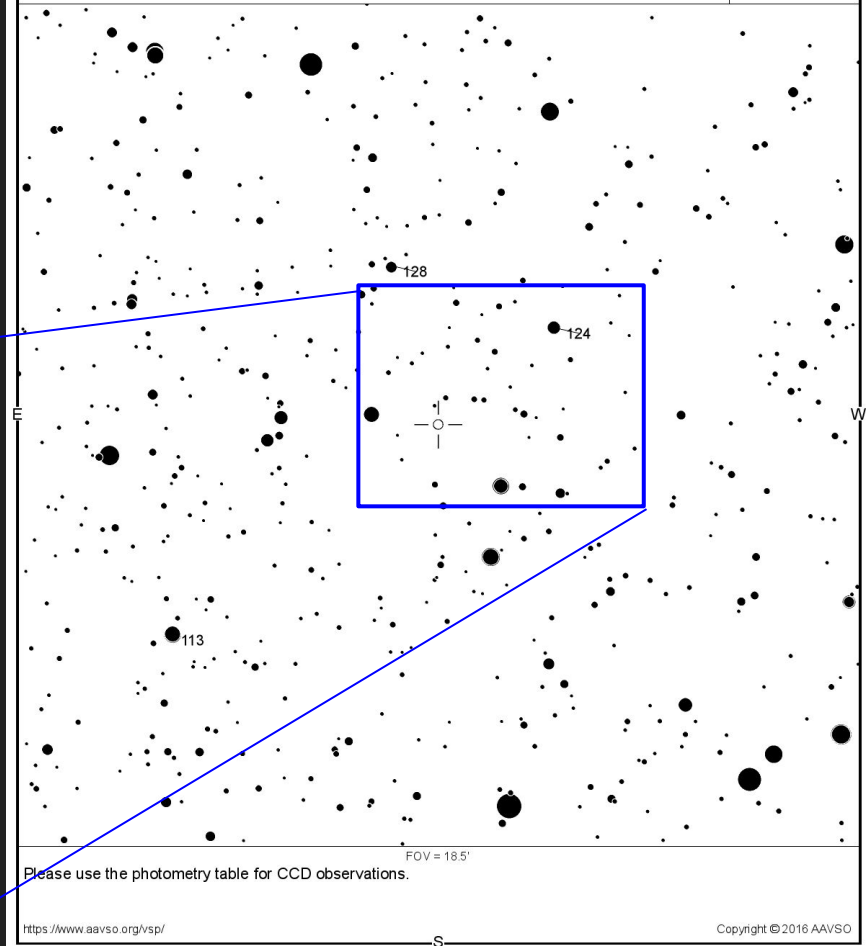
KIC 8462852

Magn: 11.88 V (0.26)Kp
Period:
Type: *+ROT
Spec: F3IV/V

KIC 8462852
(2000) 20:06:15.46 +44:27:24.8

AAVSO
Chart

X16339BXJ



Omat havainnot

Olen havainnut tähteä Hankasalmen observatorion 40 cm teleskoopilla.

Havaintostrategia:

- yksi havainto (5 kuvaa) per yö per suodin (B+V+Ic)
- nopea käsittely (VPHOT) ja raportointi AAVSOlle
- jos merkkejä himmenemisestä, niin koko yön aikasarja



1 arc min
|-----|

N
E

116

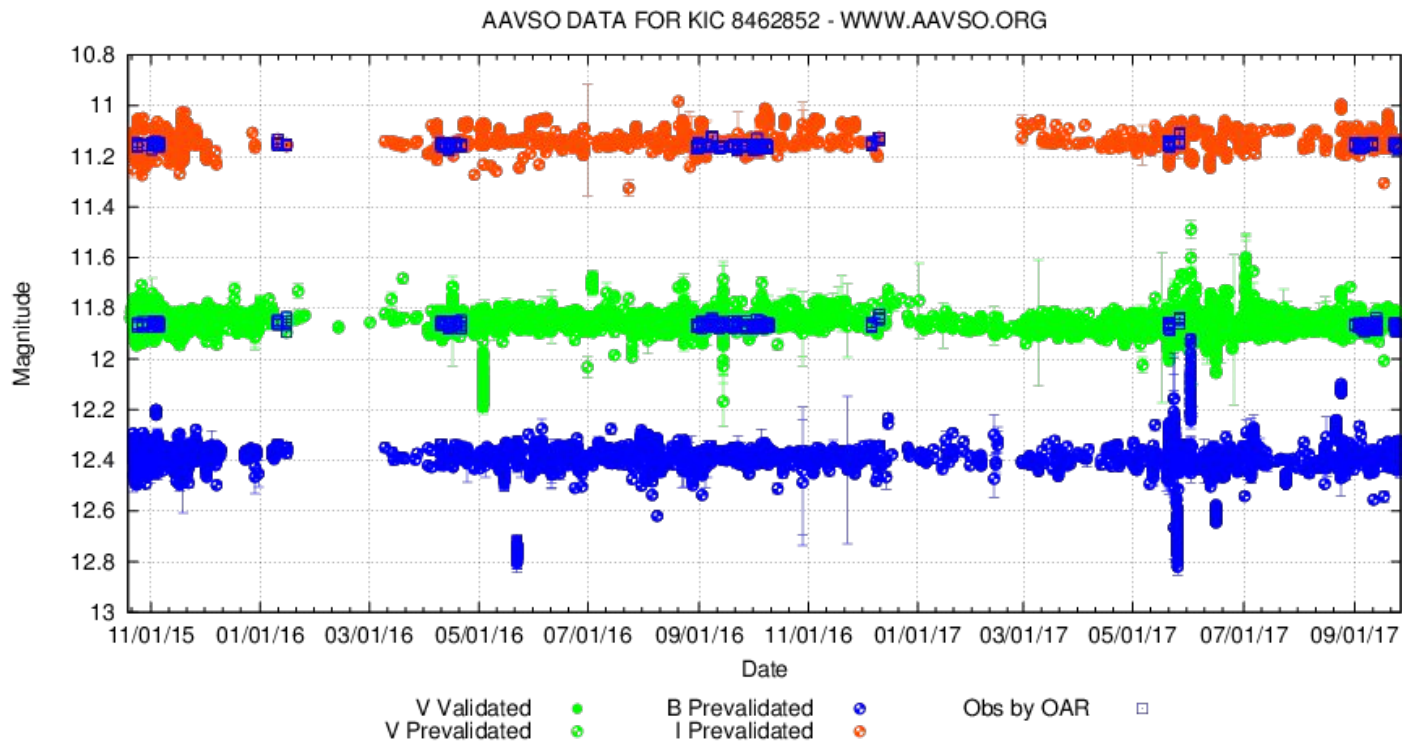
113

KIC 8462852

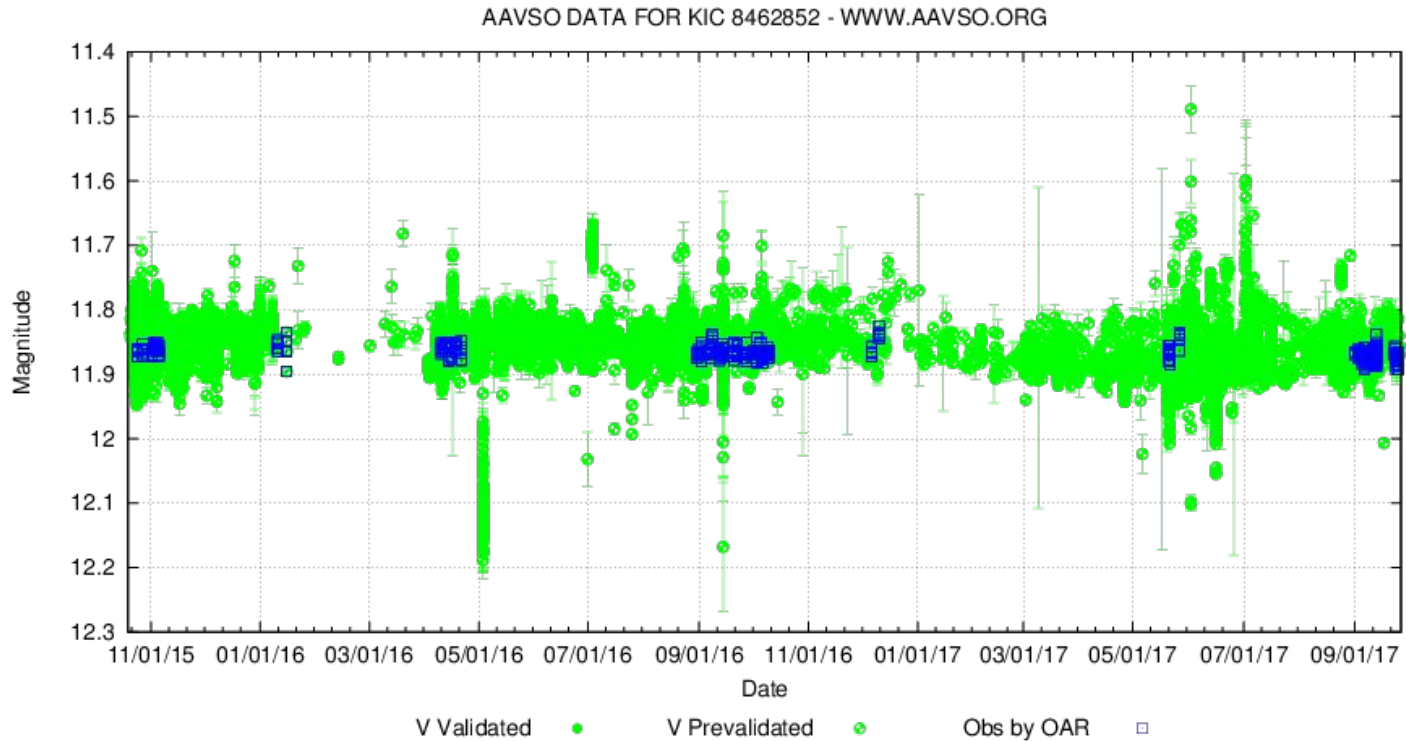
124

128

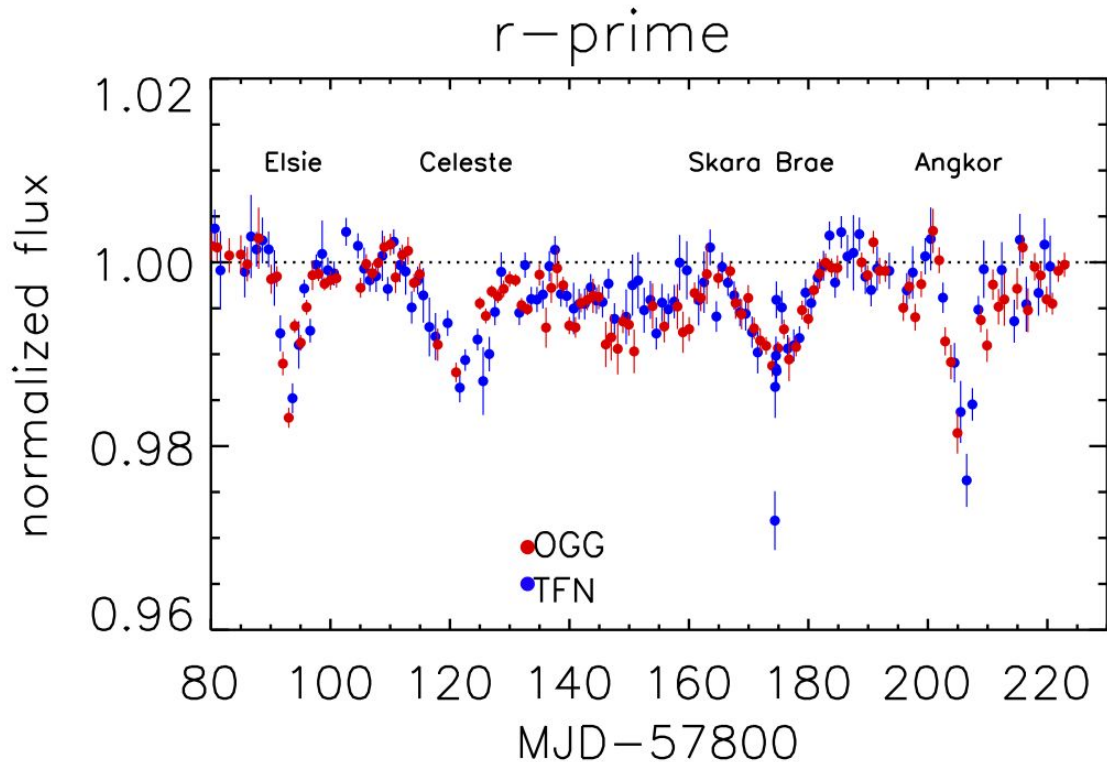
AAVSON valokäyrä



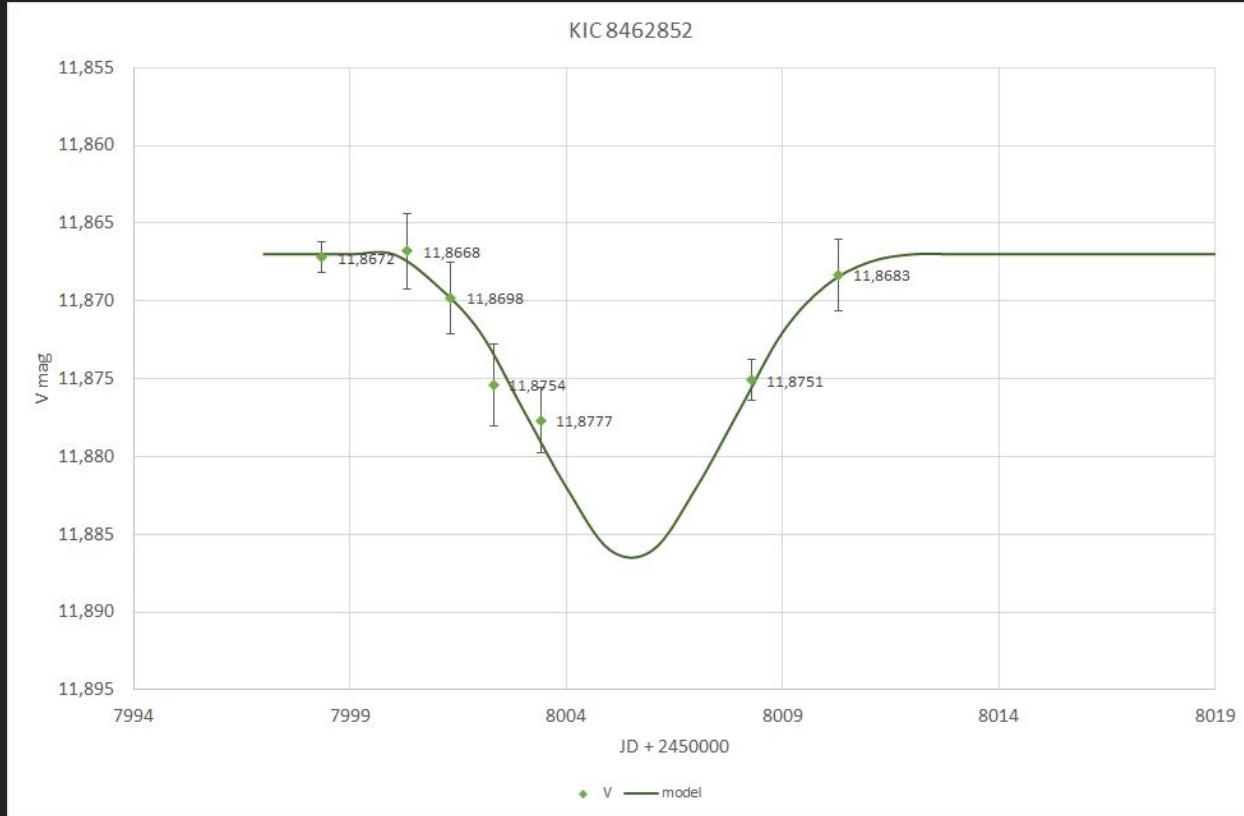
AAVSON valokäyrä - V



Kesän 2017 himmenemisrypäs



Omat havaintoni syyskuun 2017 himmenemisestä



THE FIRST POST-KEPLER BRIGHTNESS DIPS OF KIC 8462852

TABETHA S. BOYAJIAN,¹ ROI ALONSO,^{2,3} ALEX AMMERMAN,^{4,5} DAVID ARMSTRONG,^{6,7} A. ASENSIO RAMOS,^{2,3} K. BARKAOUI,^{8,9} THOMAS G. BEATTY,^{10,11} Z. BENKHALDOUN,⁹ PAUL BENNI,^{12,4} RORY BENTLEY,¹ ANDREI BERDYUGIN,¹³ SVETLANA BERDYUGINA,¹⁴ SERGE BERGERON,^{4,15} ALLYSON BIERYLA,¹⁶ MICHAELA G. BLAIN,¹⁷ ALICIA CAPETILLO BLANCO,¹⁸ EVA H. L. BODMAN,^{19,20} ANNE BOUCHER,²¹ MARK BRADLEY,⁴ STEPHEN M. BRINCAT,⁴ THOMAS G. BRINK,²² JOHN BRIOL,⁴ DAVID J. A. BROWN,^{6,7} J. BUDAJ,²³ A. BURDANOV,⁸ B. CALE,²⁴ MIGUEL AZNAR CARBO,²⁵ R. CASTILLO GARCÍA,^{26,4,27} WENDY J. CLARK,⁴ GEOFFREY C. CLAYTON,¹ JAMES L. CLEM,²⁸ PHILLIP H. COKER,⁴ EVAN M. COOK,¹⁷ CHRIS M. COPPERWHEAT,²⁹ J. CURTIS,³⁰ R. M. CUTRI,³¹ B. CSEH,³² C. H. CYNAMON,^{4,33} ALEX J. DANIELS,²⁸ JAMES R. A. DAVENPORT,^{34,35} HANS J. DEEG,^{2,3} ROBERTO DE LORENZO,³⁶ THOMAS DE JAEGER,²² JEAN-BRUNO DESROSIERES,⁴ JOHN DOLAN,^{6,7} D. J. DOWHOS,^{37,4} FRANKY DUBOIS,³⁸ R. DURKEE,³⁹ SHAWN DVORAK,⁴ LYNN EASLEY,⁴ N. EDWARDS,⁴⁰ TYLER G. ELLIS,¹ EMERY ERDELYI,⁴ STEVE ERTTEL,⁴¹ RAFAEL G. FARFÁN,⁴² J. FARIHI,⁴³ ALEXEI V. FILIPPENKO,^{22,44} EMMA FOXELL,^{6,7} DAVIDE GANDOLFI,⁴⁵ FAUSTINO GARCIA,^{46,47} F. GIDDENS,⁴⁸ M. GILLON,⁴ JUAN-LUIS GONZÁLEZ-CARBALLO,^{49,4} C. GONZÁLEZ-FERNÁNDEZ,⁵⁰ J. I. GONZÁLEZ HERNÁNDEZ,^{51,3} KEITH A. GRAHAM,⁴ KENTON A. GREENE,¹⁷ J. GREGORIO,⁵² NA'AMA HALLAKOUN,⁵³ OTTÓ HANYECZ,^{54,32} G. R. HARP,⁵⁵ GREGORY W. HENRY,⁵⁶ E. HERRERO,⁵⁷ CALEB F. HILDBOLD,²⁸ D. HINZEL,⁴ G. HOLGADO,^{2,3} BERNADETTE IGNÁZ,^{54,32} VALENTIN D. IVANOV,^{58,59} E. JEHN,⁶⁰ HELEN E. JERMAK,²⁹ STEVE JOHNSTON,⁴ S. KAFKA,⁴ CSILLA KALUP,^{54,32} EMMANUEL KARDASIS,⁶¹ SHAJ KASPI,⁵³ GRANT M. KENNEDY,⁶ F. KETTER,⁶² L. C. KIELTY,⁶³ DENNIS KESSLER,⁴ H. KIISKINEN,^{64,3} L. KILLESTEIN,^{66,4} RONALD A. KING,⁴ V. KOLLAR,⁴ H. KORHONEN,⁶⁵ C. KOTNIK,⁴ RÉKA KÖNYVÖS-TÓTH,^{54,32} LEVENTE KRISKOVICS,³² NATHAN KRUMM,⁴ VADIM KRUSHINSKY,⁶⁸ E. KUNDRA,²³ FRANÇOIS-RENE LACHAPELLE,²¹ D. LACOURSE,⁶⁹ P. LAKE,^{4,70,71} KRISTINE LAM,^{6,7} GAVIN P. LAMB,²⁹ DAVE LANE,⁷² MARIE WINGYEE LAU,⁷³ PABLO LEWIN,^{4,74} CHRIS LINTOTT,⁷⁵ CAREY LISSE,⁷⁶ LUDWIG LOGIE,⁷⁷ NICOLAS LONGEARD,⁷⁸ M. LOPEZ VILLANUEVA,⁷⁹ E. WHIT LUDINGTON,^{4,80} A. MAINZER,⁸¹ LISON MALO,^{82,83} CHRIS MALONEY,⁴ A. MANN,⁸⁴ A. MANTERO,⁴ MASSIMO MARENGO,⁸⁵ JON MARCHANT,²⁹ M. J. MARTÍNEZ GONZÁLEZ,^{2,3} JOSEPH R. MASIERO,³⁶ JON C. MAUERHAN,²² JAMES MCCORMACK,^{6,7} AARON MCNEELY,^{4,5} HUAN Y. A. MENG,⁴¹ MIKE MILLER,^{4,87} LAWRENCE A. MOLNAR,¹⁷ J. C. MORALES,⁸⁸ BRETT M. MORRIS,⁸⁹ MATTHEW W. MURTERSPACHER,^{90,90} DAVID NESPRAL,^{2,3} C. R. NUGENT,⁹¹ KATHERINE M. NUGENT,¹ A. ODASSO,^{37,4} DEREK O'KEEFE,⁴ A. OKSANEN,⁹² JOHN M. O'MEARA,⁹³ ANDRÁS ORDÁSI,³² HUGH OSBORN,^{94,6,7} JOHN J. OTT,⁴ J. R. PARKS,⁹⁵ DIEGO RODRÍGUEZ PEREZ,⁴ VANCE PETRIEW,^{4,15} R. PICKARD,⁹⁶ ANDRÁS PÁL,³² P. PLAVCHAN,³⁷ C. WESTENDORP PLAZA,^{2,3} DON POLLACCO,^{6,7} F. POZO NUÑEZ,^{98,99} F. J. POZUELOS,¹⁰⁰ STEVE RAU,¹⁰¹ SETH REDFIELD,¹⁰² HOWARD RELLES,¹⁰ I. RIBAS,⁸⁸ JON RICHARDS,^{103,104} JOONAS L. O. SAARIO,^{105,106} EMILY J. SAFRON,¹ J. MARTIN SALLAT,^{32,54} KRISZTIÁN SÁRNECZKY,³² BRADLEY E. SCHAEFER,¹ CLEA F. SCHUMER,^{111,112} MADISON SCHWARTZENDRUBER,^{4,5} MICHAEL H. SIEGEL,¹⁰⁷ ANDREW P. V. SIEMION,^{108,109,110} BROOKE D. SIMMONS,^{111,112} JOSHUA D. SIMON,¹¹³ S. SIMÓN-DÍAZ,^{2,3} MICHAEL L. SITKO,^{114,115} HECTOR SOCAS-NAVARRO,^{2,3} Á. SÓDOR,³² DONN STARKEY,¹¹⁶ IAIN A. STEELE,²⁹ GEOFF STONE,^{117,4} R.A. STREET,¹¹⁸ TRICIA SULLIVAN,⁶⁹ J. SUOMELA,¹¹⁹ J. J. SWIFT,⁴⁰ GYULA M. SZABÓ,¹²⁰ RÓBERT SZABÓ,³² RÓBERT SZAKÁTS,³² TAMÁS SZALAI,¹²¹ ANGELLE M. FANNER,¹²² B. TOLEDO-PADRÓN,^{2,3} TAMÁS TORDAI,¹²³ AMAURY H.M.J. TRIAUD,¹²⁴ JAKE D. TURNER,¹²⁵ JOSEPH H. ULOWETZ,⁴ MARIAN URBANIK,^{4,126} SIEGFRIED VANAUVERBEKE,^{77,127} ANDREW VANDERBURG,¹²⁸ KRISZTIÁN VIDA,³² BRAD P. VIETJE,⁴ JÓZSEF VINKÓ,³² K. VON BRAUN,¹²⁹ ELIZABETH O. WAAGEN,⁴ DAN WALSH,^{4,5} CHRISTOPHER A. WATSON,¹³⁰ R. C. WEIR,⁴ KLAUS WENZEL,¹³¹ MICHAEL W. WILLIAMSON,³⁶ JASON T. WRIGHT,^{10,11,132} M. C. WYATT,¹³³ WEIKANG ZHENG,²² AND GABRIELLA ZSIDI,^{54,32}

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⁴American Association of Variable Star Observers

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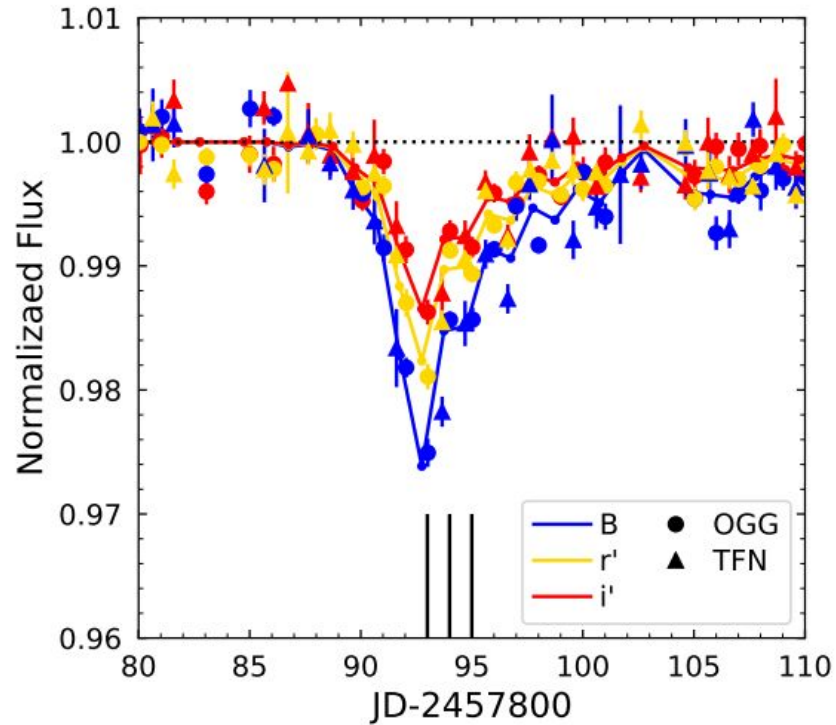
⁶Department of Physics, University of Warwick, Gibbet Hill Road, Coventry, CV4 7AL, UK

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Abstract

We present a photometric detection of the first brightness dips of the unique variable star KIC 8462852 since the end of the Kepler space mission in 2013 May. Our regular photometric surveillance started in 2015 October, and a sequence of dipping began in 2017 May continuing on through the end of 2017, when the star was no longer visible from Earth. We distinguish four main 1%–2.5% dips, named "Elsie," "Celeste," "Skara Brae," and "Angkor," which persist on timescales from several days to weeks. Our main results so far are as follows: (i) there are no apparent changes of the stellar spectrum or polarization during the dips and (ii) the multiband photometry of the dips shows differential reddening favoring non-gray extinction. Therefore, our data are inconsistent with dip models that invoke optically thick material, but rather they are in-line with predictions for an occulter consisting primarily of ordinary dust, where much of the material must be optically thin with a size scale $\ll 1\ \mu\text{m}$, and may also be consistent with models invoking variations intrinsic to the stellar photosphere. Notably, our data do not place constraints on the color of the longer-term "secular" dimming, which may be caused by independent processes, or probe different regimes of a single process.

Pimennys eri suotimilla



Vieras sivilisaatio?

Vieraan supersivilisaation rakentama aurinkokeräin on saanut meidän eniten huomiota.

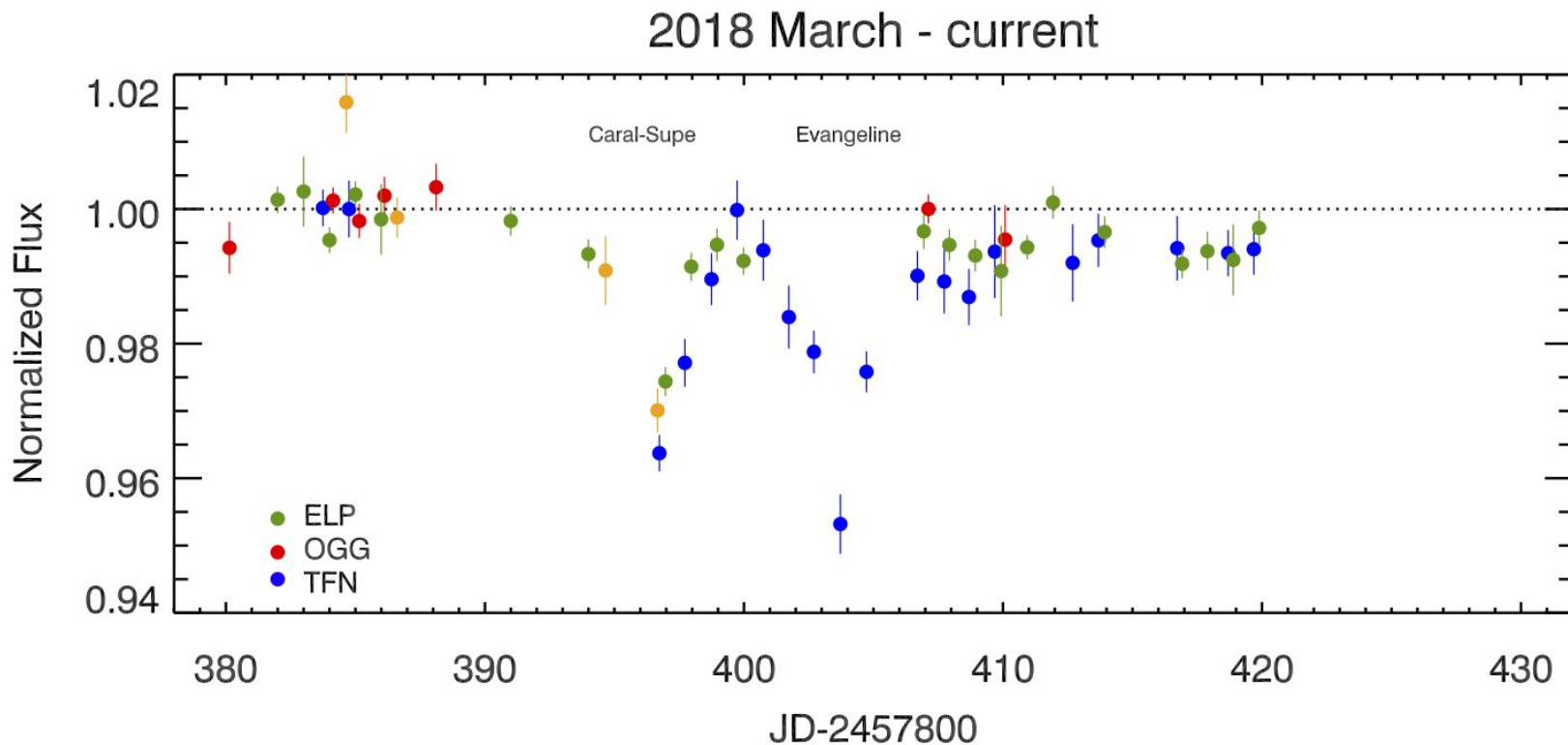
Jos sivilisaatio käyttää paljon energiaa sen pitäisi näkyä lämpösäteilynä. Tätä ei ole kuitenkaan havaittu.

Ehkä on vasta rakenteilla?

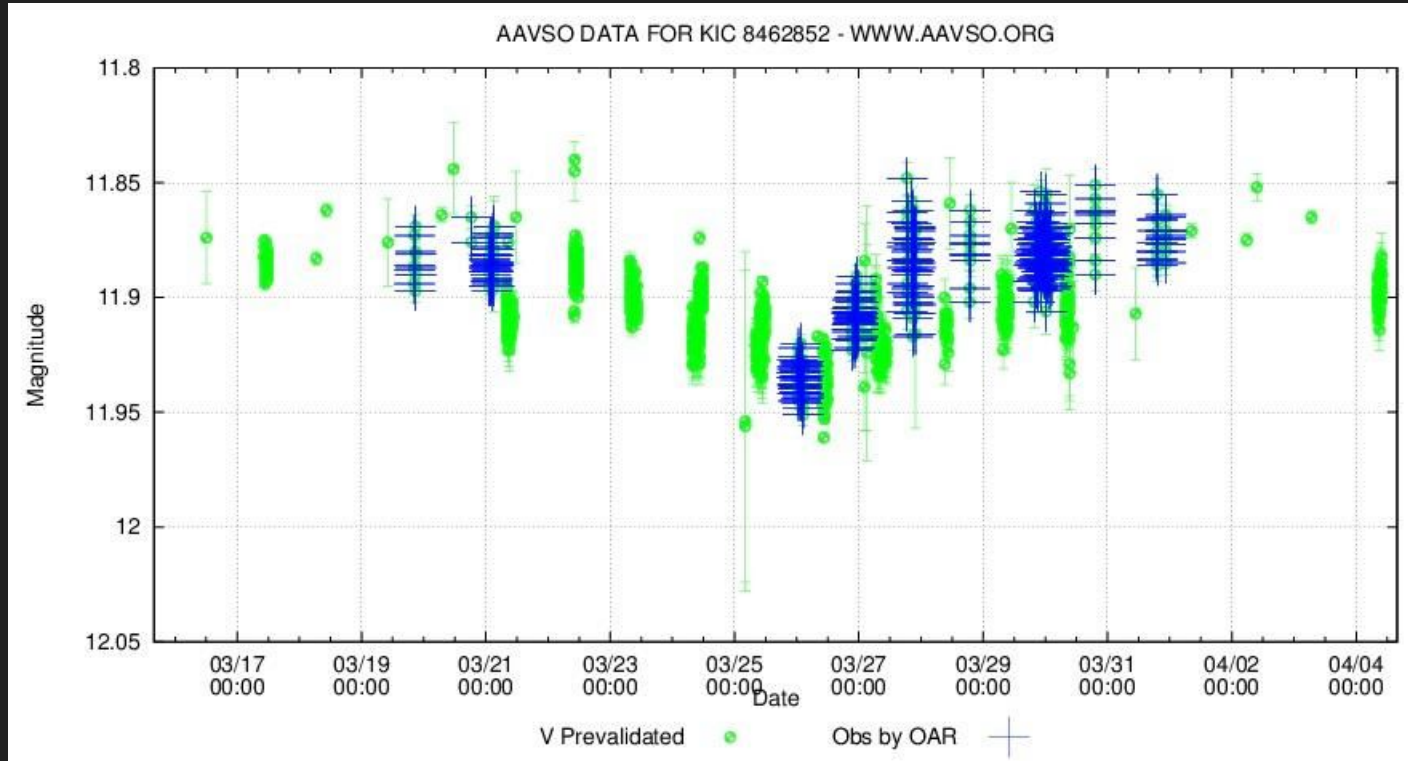
Periaatteessa mahdollinen selitys.



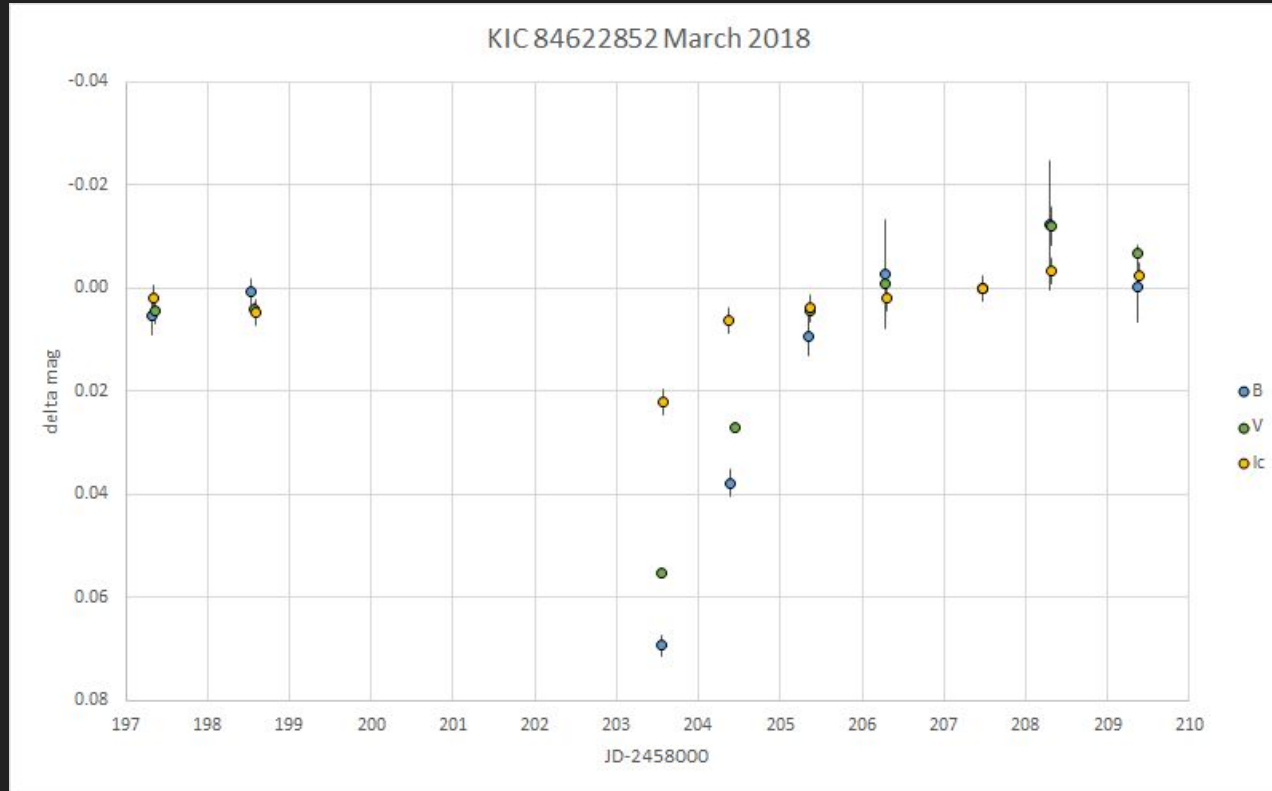
Pro-havainnot (1.3.2018 - 21.4.2018)



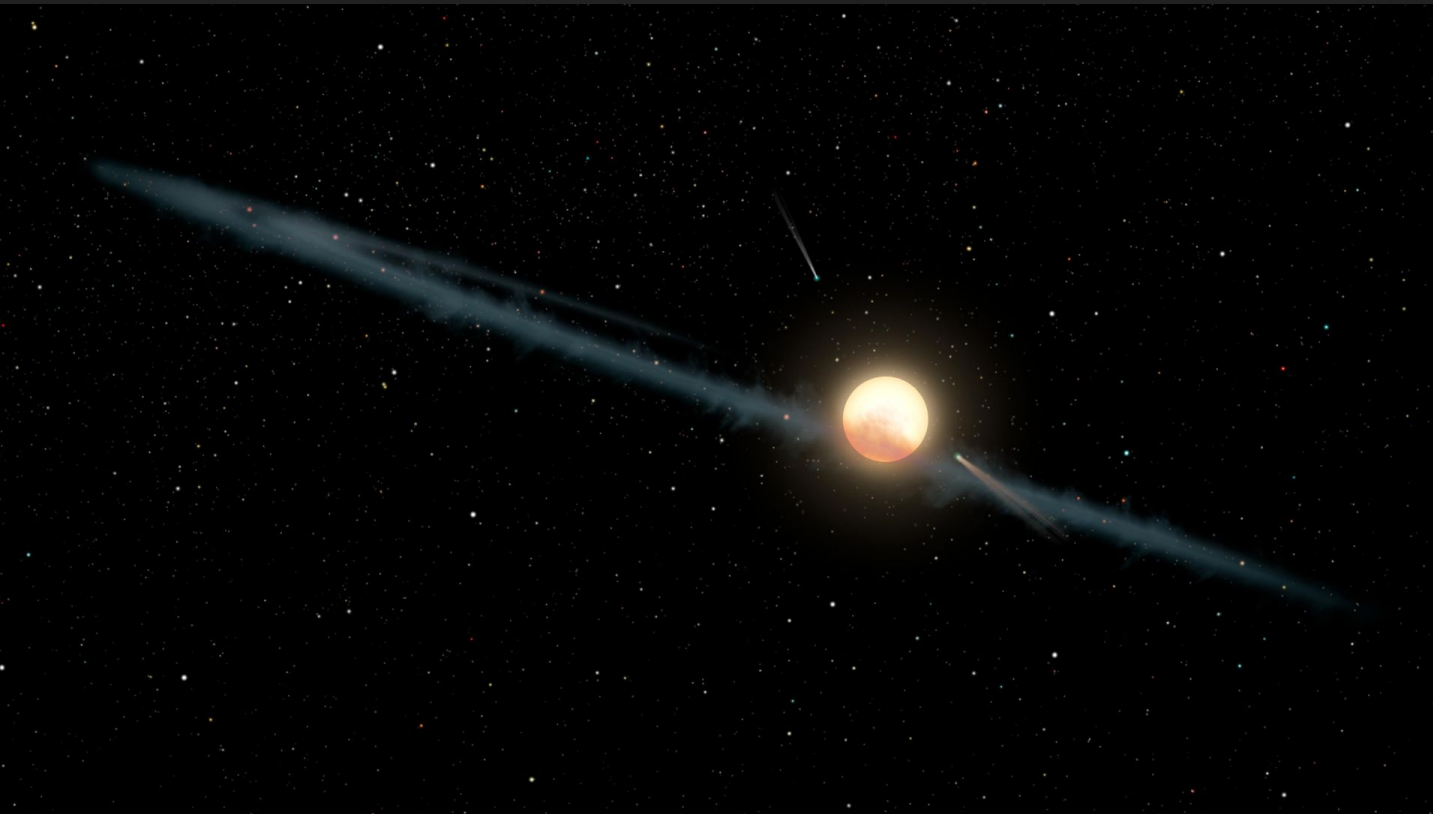
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Maaliskuun 2018 toinen himmeneminen



Epätasainen pölyrengas?



Artikkeli tulossa tähden hitaasta himmenemisestä

MNRAS **000**, 1–9 (2018)

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The KIC 8462852 Light Curve From 2015.75 to 2018.18 Shows a Variable Secular Decline

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Shawn Dvorak^{2,3}, Franky Dubois^{2,4,5}, Emery Erdelyi^{2,6}, Tyler Ellis¹,
Keith Graham², Barbara G. Harris^{2,7}, John E. Hall^{2,8}, Robert James²,
Steve J. Johnston^{2,9}, Grant Kennedy¹⁰, Ludwig Logie^{4,5}, Katherine M. Nugent¹,
Arto Oksanen^{2,11}, John J. Ott^{2,12}, Steve Rau^{4,5}, Siegfried Vanaverbeke^{4,5},
Rik van Lieshout¹³, and Mark Wyatt¹³

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¹⁰Department of Physics, University of Warwick, Coventry CV4 7AL, UK

¹¹Hankasalmi Observatory, Hankasalmi, Finland

¹²Ott Observatory, Nederland Colorado, USA

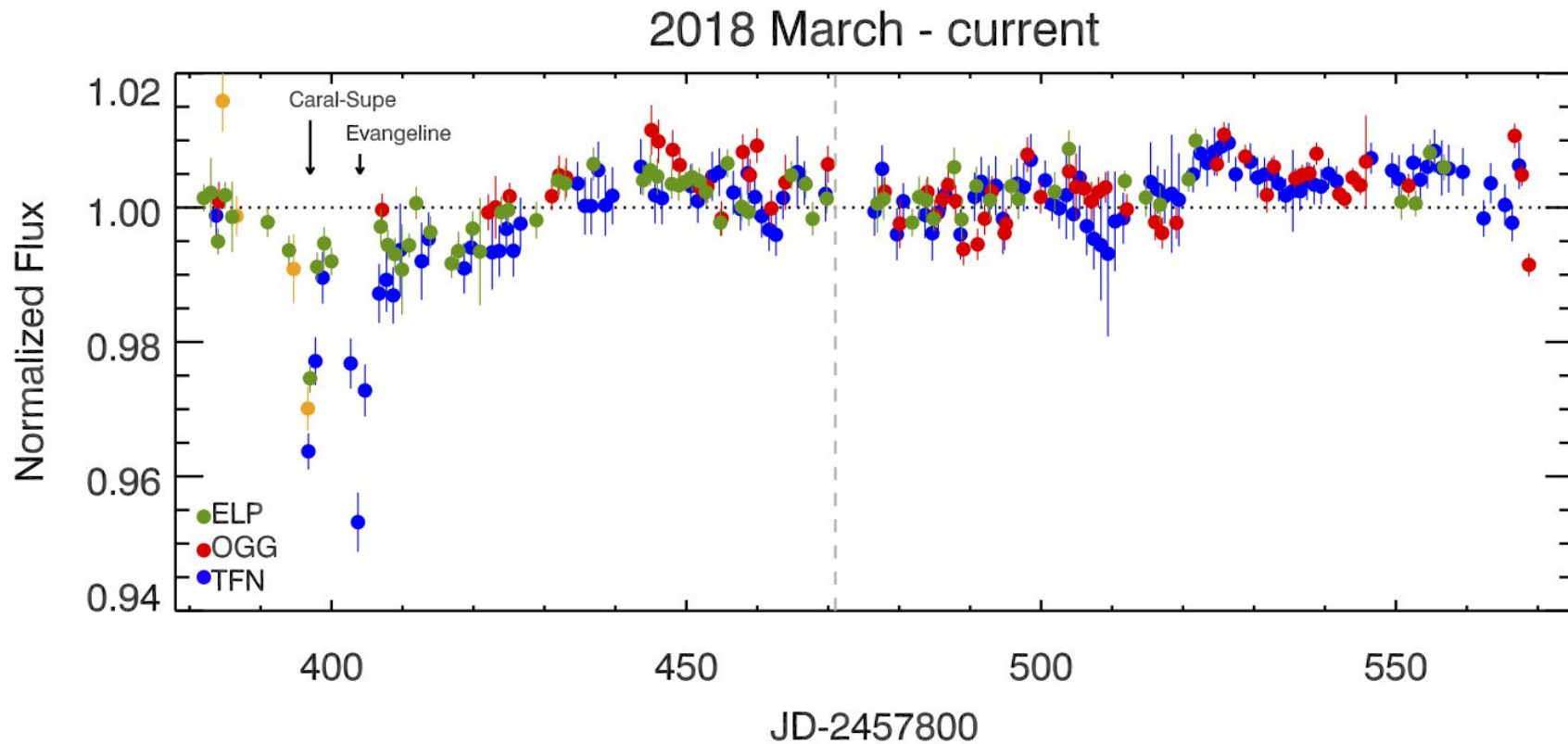
¹³Institute of Astronomy, University of Cambridge, Madingley Road, Cambridge CB3 0HA, UK

Accepted XXX. Received YYY; in original form ZZZ

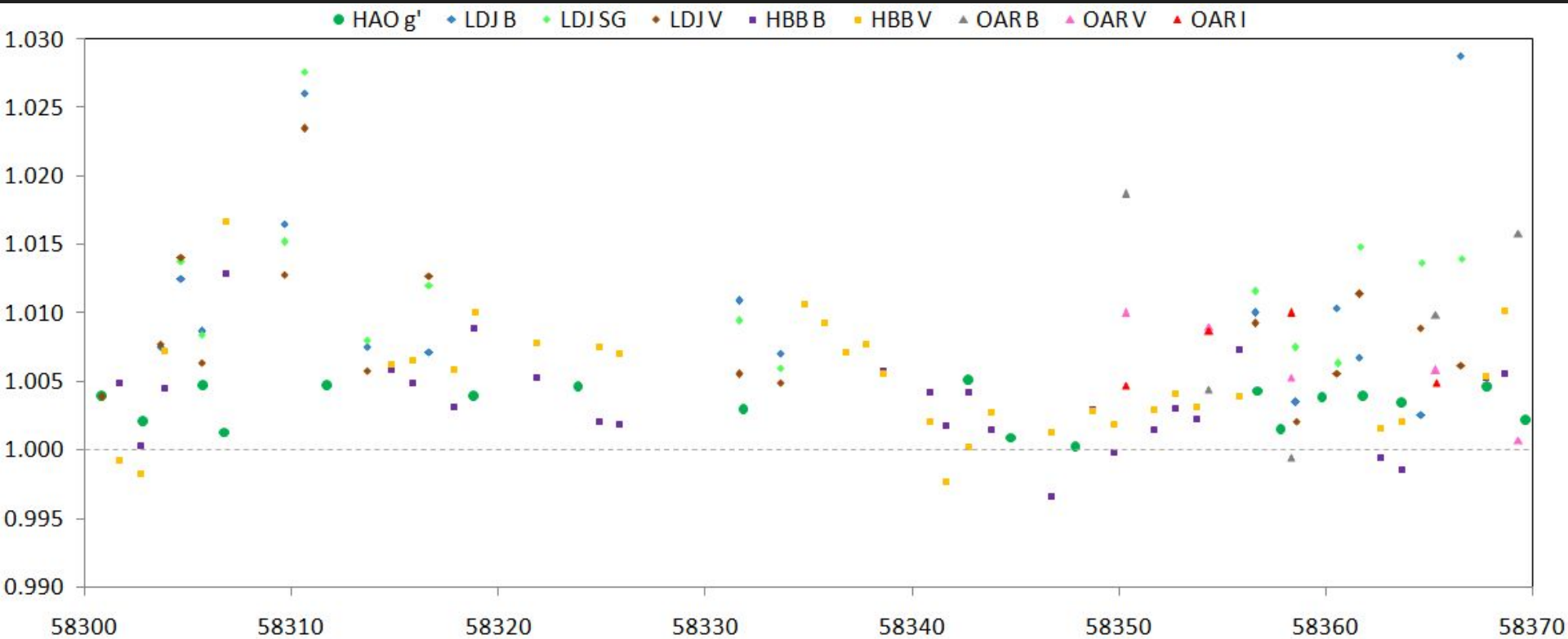
ABSTRACT

The star KIC 8462852 (Boyajian's Star) displays both fast dips of up to 20% on time scales of days, plus long-term secular fading by up to 19% on time scales from a year to a century. Either such behavior in an isolated, middle-aged F3 main sequence star is completely unprecedented and inexplicable, making for much excitement as to the physical mechanism. We report on CCD photometry of KIC 8462852 from 2015.75 to 2018.18, with 19,176 images making for 1,866 nightly magnitudes in B-, V-, R-, and I-bands. Our light curves show a continuing secular decline (by 0.023 ± 0.003 mags in the B-band) with three superposed dips with duration 120–180 days as well as superposed dips with duration 1–10 days. This demonstrates that there is a continuum of dip durations from a day to a century, so that the secular fading is seen to be by the same physical mechanism as the short duration *Kpler* dips. The elements of the light curve

Uusi himmeneminen?



Ei kuitenkaan.



KYSYMYKSIÄ?



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