Observing “Tabby’s star” KIC 8462852

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Background

Kepler satellite found KIC 8462852 to exhibit several apparently non-repeating dips of several percentage from the normal brightness of V=11.8 magnitudes with durations of few days (Boyajian et al. 2016). No other stars are known to behave similarly. The observations by Kepler were done in single wide bandpass filter, so it was not known if the dips were different in different colors to help understanding them better. Unfortunately the technical problems with the spacecraft did not allow longer observing run.

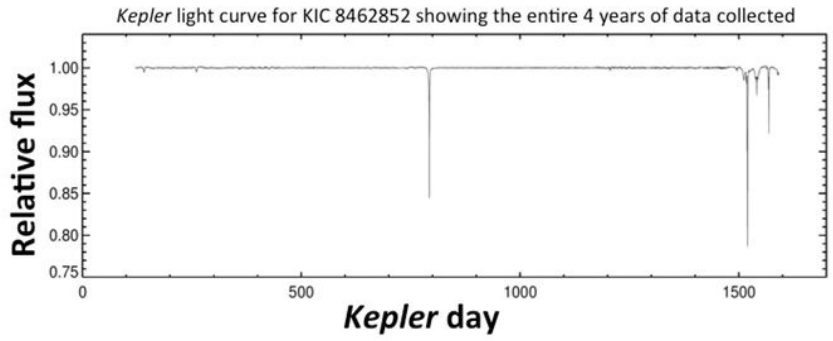

Fig 1. Kepler light curve for KIC 8462852 showing the entire 4 years of data collected from May 2009 to May 2013.

Amateur observations

The American Association of variable Star Observers (AAVSO) initiated an observing campaign in October 2015 for amateur astronomers to monitor the star after the Kepler observations. The AAVSO selected several comparison stars for KIC 8462852 and provided charts. Oksanen and Harris, both started observing on the same date Oct. 18, 2015. Since then Oksanen has submitted 2244 observations and Harris 4824 observations. All together there are 61252 observations of KIC 8462852 in the AAVSO database (May 23, 2018).

Oksanen uses the remote operable 40 cm RC telescope of the Hankasalmi observatory located in Hankasalmi, Finland. Harris uses her own 40 cm SCT telescope in New Smyrna Beach, Florida, USA.

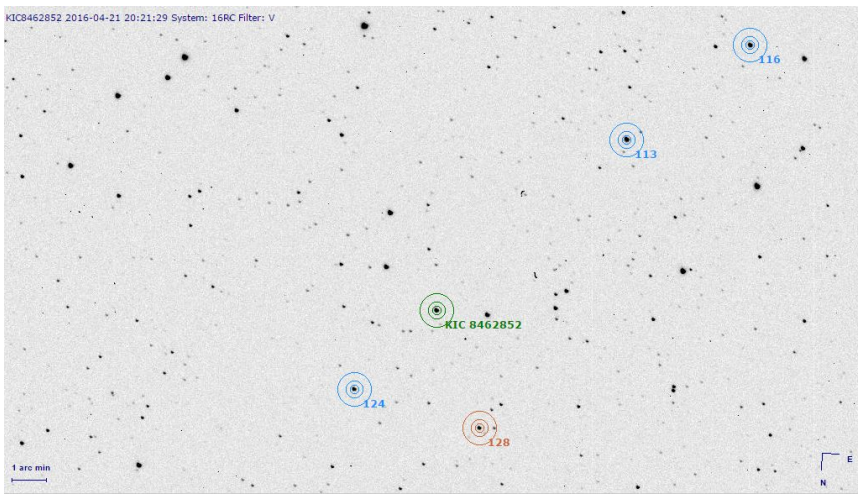

Fig 2. Typical CCD field of KIC 8462852 showing the target star (green), several comparison stars (blue) and one check star (orange). Typical observing run consist of several short exposure frames per each of the filters.

The dip of March 26, 2018

The second dip of KIC 8462852 in March 2018 was the deepest one since the Kepler observations. The fading started on March 23 and ended on March 29 by our observations (Fig. 3). The minimum occured on March 26, 2018 (JD 2458203). The dip was clearly deeper in the shorter wavelengths, up to 0.069 +/- 0.004 magnitudes in the B band and 0.022 +/- 0.002 magnitudes in Ic band. This agrees well with the results obtained with analysis of the shallower dips observed in 2017 (Boyajian et al. 2018).

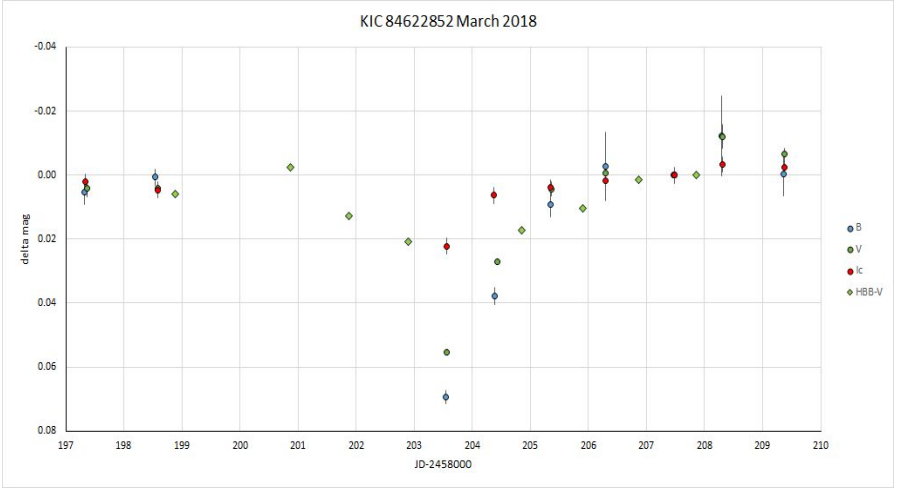

Fig 3. Light curve of the March 26 fading. Observations by Oksanen B (B band), V (V band) and Ic (I band), observations by Harris HBB-V (V band). Magnitudes are adjusted so that March 31, 2018 (JD 2458207) is set to 0.0 in each band.

Filter	delta mag	relative flux %
B	0.0694 +/- 0.0039	93.8 +/- 0.4
V	0.0554 +/- 0.0016	95.0 +/- 0.1
Ic	0.0222 +/- 0.0017	98.0 +/- 0.2

Table 1. The observed relative fading in three bandpass on March 26, 2018 compared to the brightness on March 31, 2018.

Conclusion

Amateur astronomers can make good quality observations and important scientific results by long term observations and dedication for the observing.

Multiband photometry taken during the March 26 dip indicate that the dip amplitude is clearly chromatic, with depth ratios that are consistent with occultation by optically thin dust with size scales less than 1μm.

Acknowledgements

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References

Boyajian T. S., et al., 2016, MNRAS, 457, 3988
Boyajian T. S., et al., 2018, ApJ, 853L, 8B