Preliminary results for the microlensing event Gaia19dke

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Gaia19dke

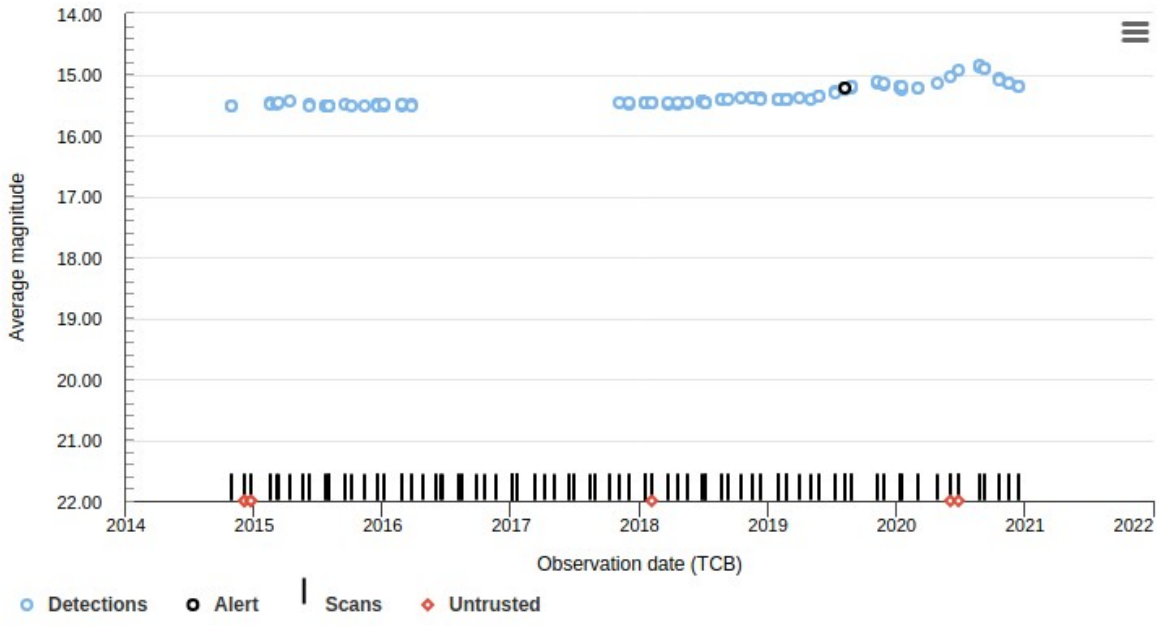
Details | Follow-up

Other surveys detections
None
Comments
~0.3 mag increase in Gaia source
ATels
None
AstroNotes
None

TNS ID
AT2019ndl

RA - DEC
291.49451 28.40686
19:25:58.68 28:24:24.70
Galactic coords.
62.01113 5.70414

Alerting date
2019-08-08 02:58:44
Julian date
2458703.62
Alerting magnitude
15.23
Historic magnitude
15.51
Historic StdDev
0.05
Class
unknown
Publication date
Aug. 10, 2019, 1:55 p.m.



See here for an explanation of lightcurves. Get lightcurve data

Gaia19dke

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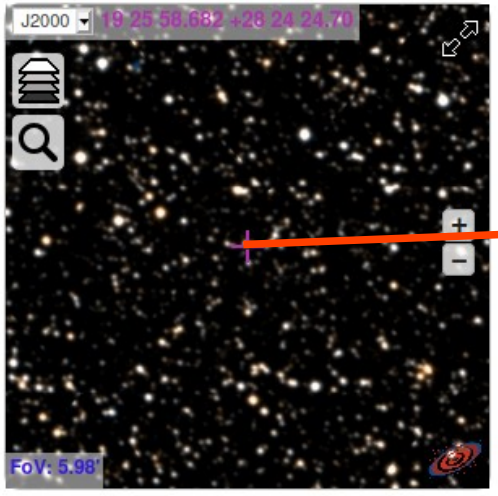

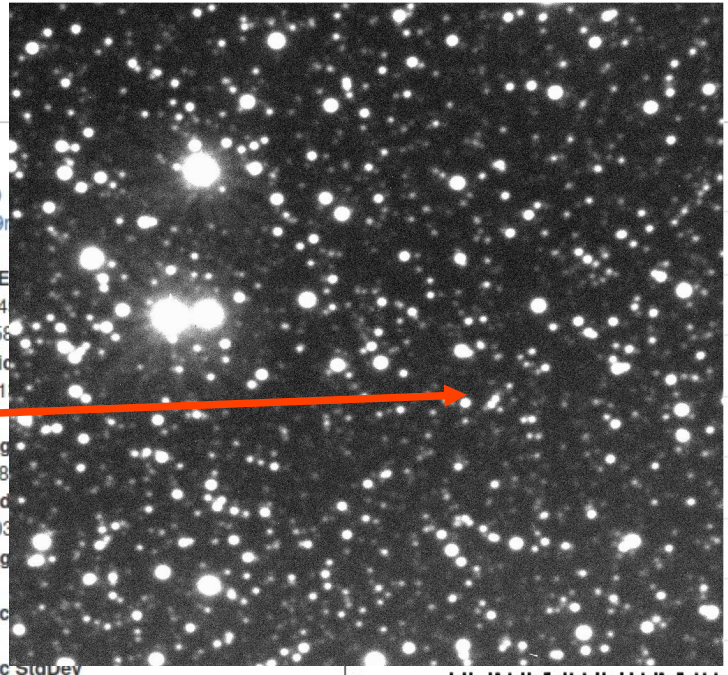

TNS ID
AT2019

RA - DE
291.494
19:25:58

Galactic
62.0111

Alerting
2019-08

Julian d
2458703

Alerting
15.23

Historic
15.51

Historic StdDev
0.05

Class
unknown

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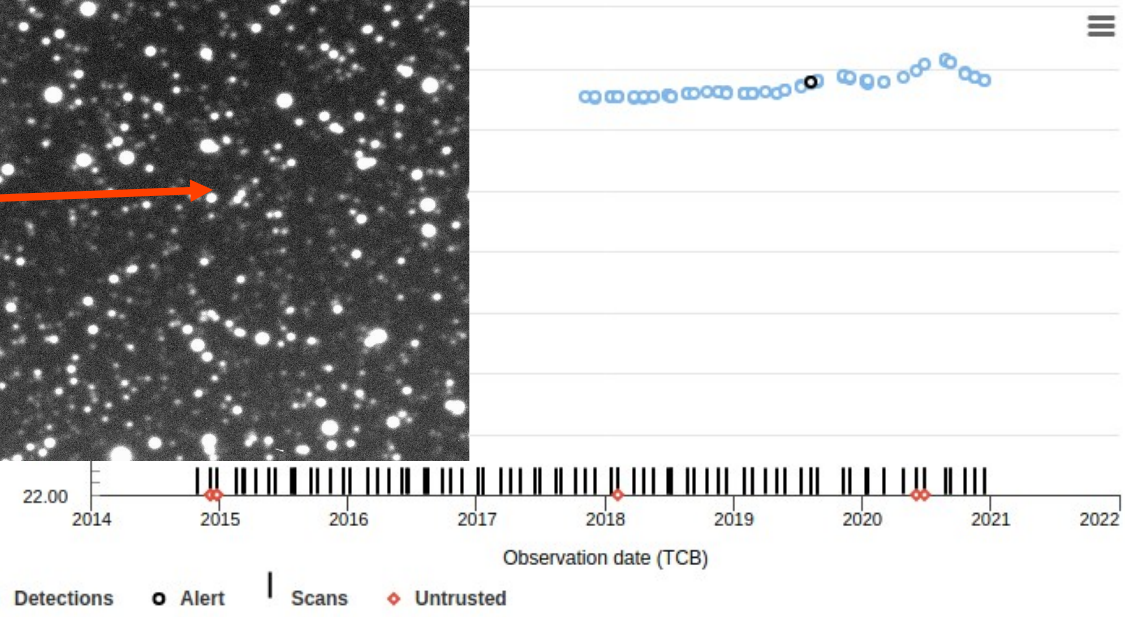

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ATels
None

AstroNotes
None

Gaia19dke

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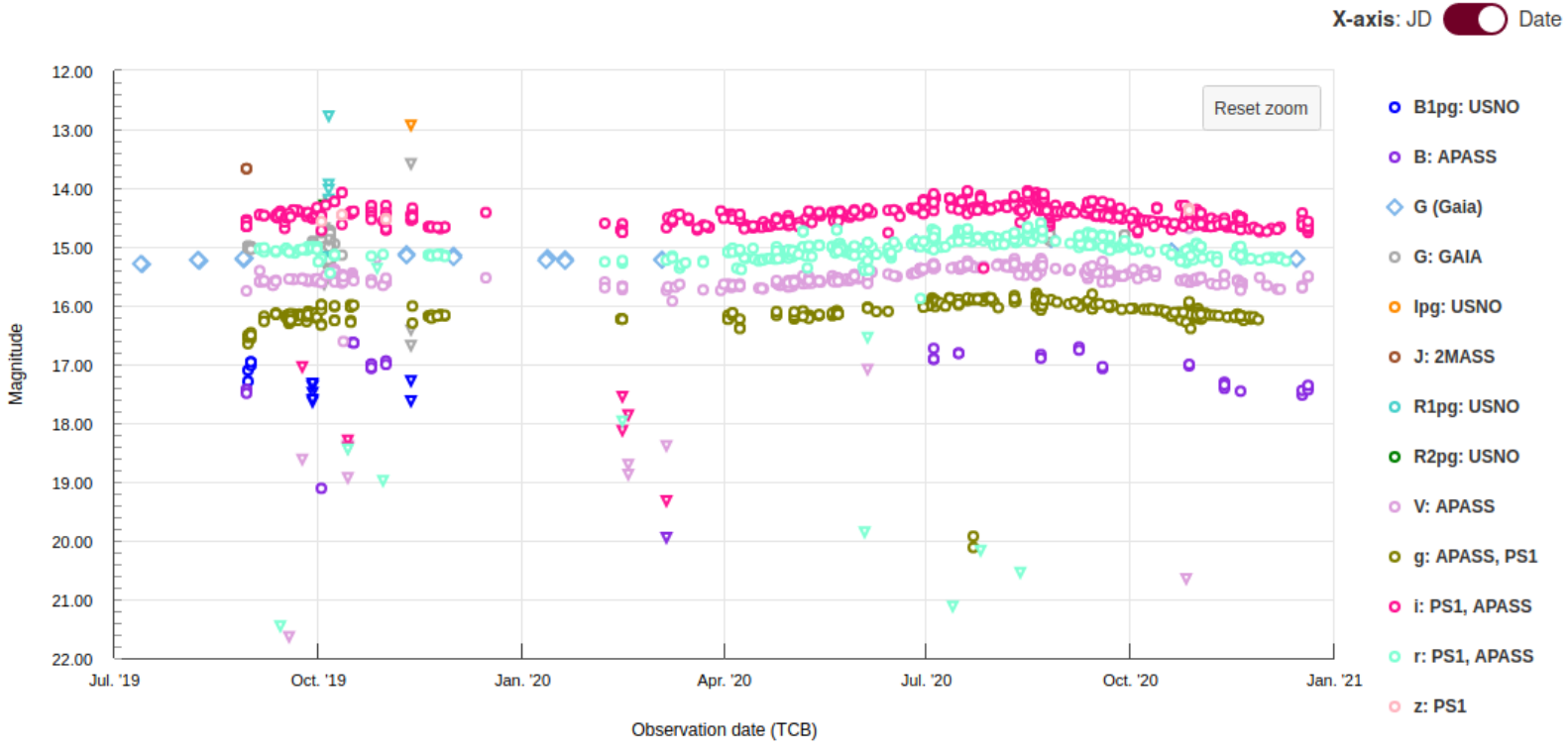
The figure shows the Gaia lightcurve combined with photometric follow-up photometry generously provided by the astronomical community using the Cambridge Photometry Calibration Server (CPCS). Multiple filters are shown in one figure and can be toggled on/off using the legend on the side. Click and drag in the chart to zoom in. Clicking on datapoints provides additional information of the observation.

Access to these photometric data may be requested from the individuals who took the data. Please contact us if you would like to ask for access and we will pass on your request.

Warning: The follow-up data is obtained using rough calibrations and we can not guarantee its complete correctness at this stage.



Gaia19dke

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First Follow-up data on 2019-08-29 (21 day after the alert) was from Goran Damljanovic, Serbia.

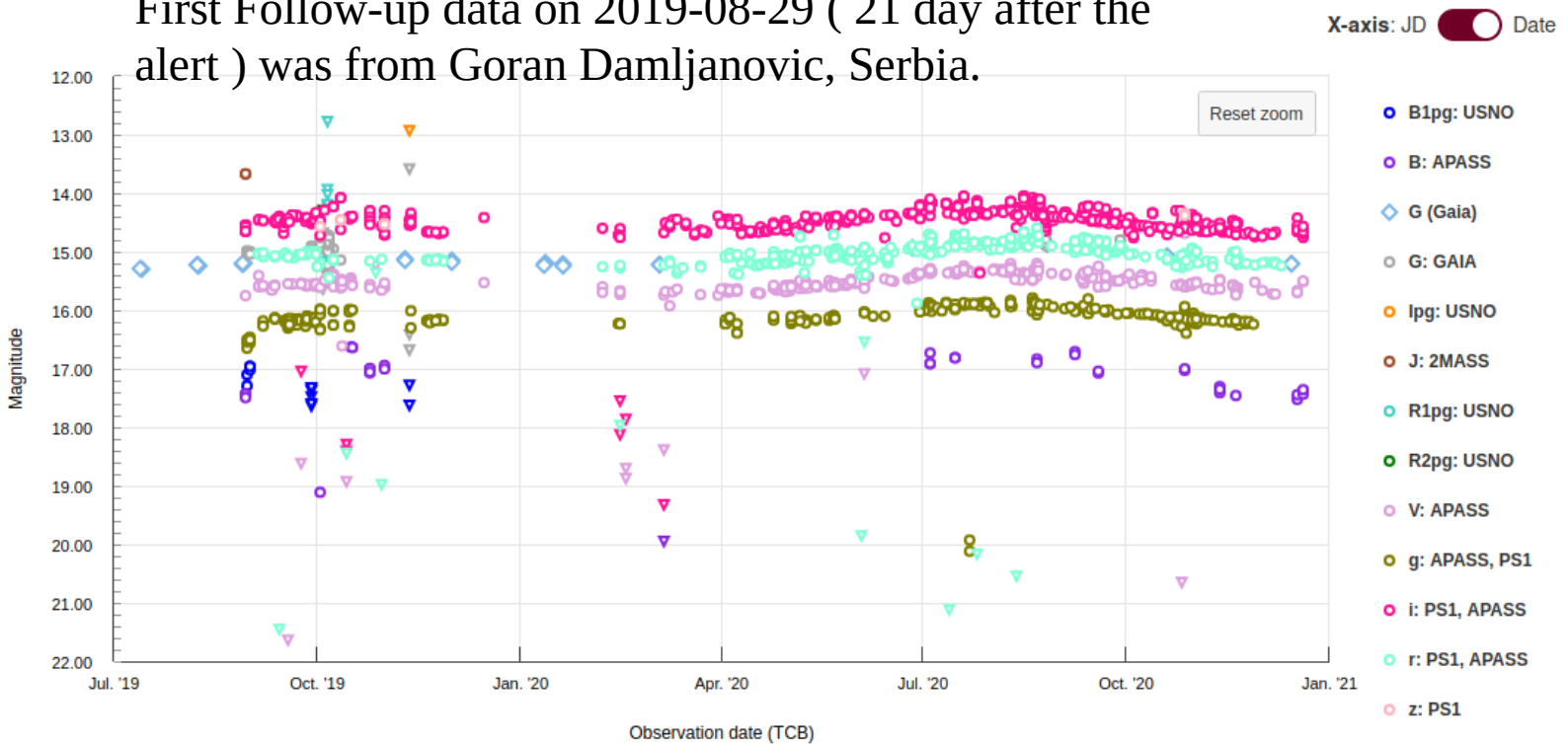

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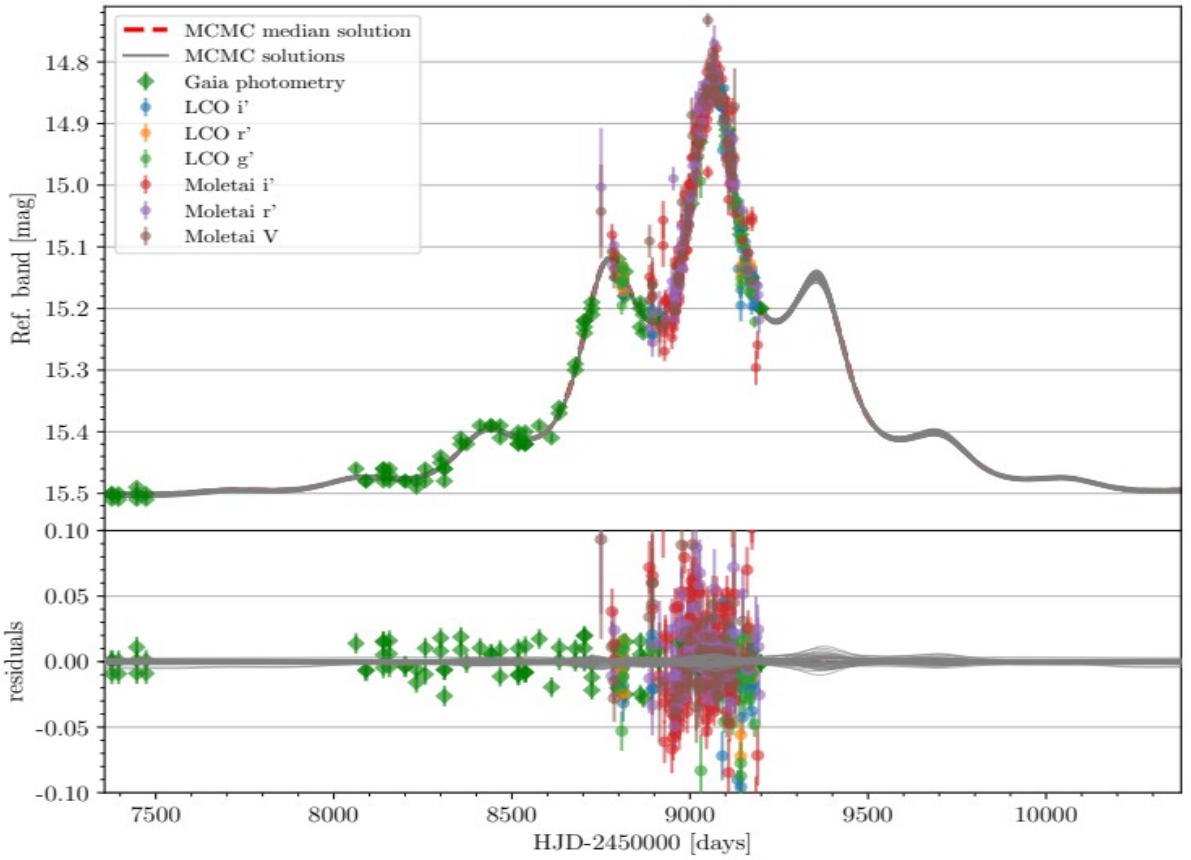
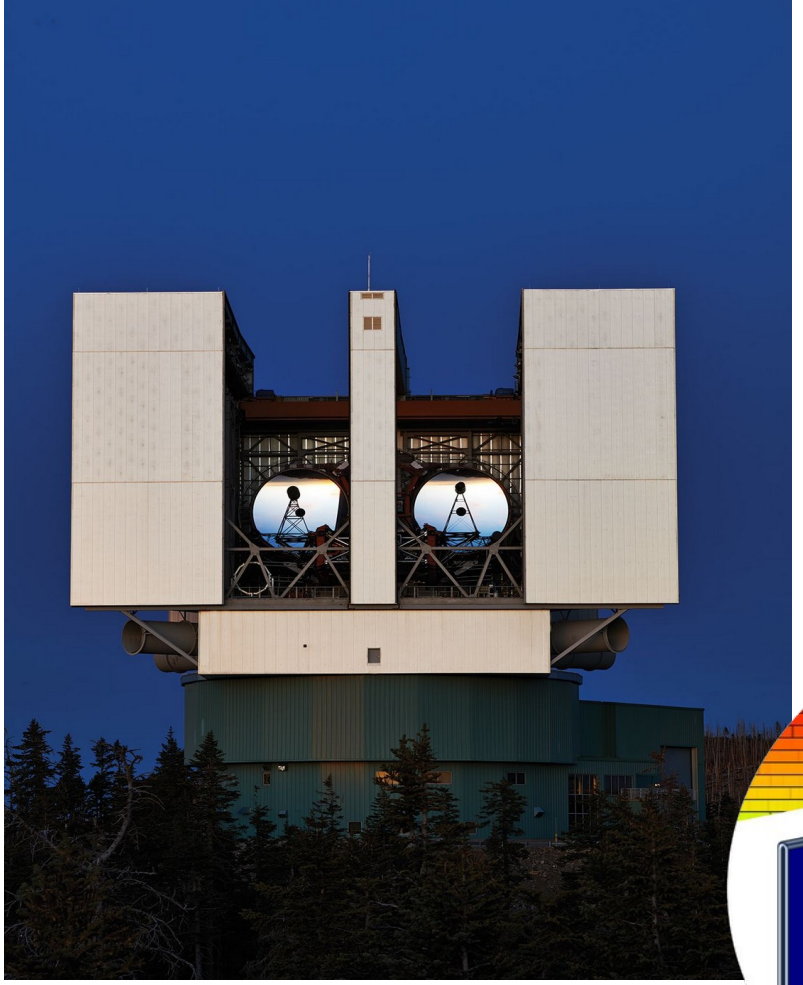
Table 1. Photometric data colected for Gaia19dke.

Observatory	Filters
Gaia	G
Moletai	i, r, V
T100, Hasan Esenoglu	i, r, V
Abastumani36, Teimur	i, r, V, B
LCOGT1m, Kris Rybick / Etienne Bac	i, r, g,
IRIS Siegfried Vanav	i, V,
ObsMontsec-Umut Burg	???
IST60, Tolga Guver	g, R2, V, B,
Goran Damljanovic, A	J2mass, i, V, B,
Rozheri 0.6 Jochen He	i,

Data sets used for the modelling Gaia19dke





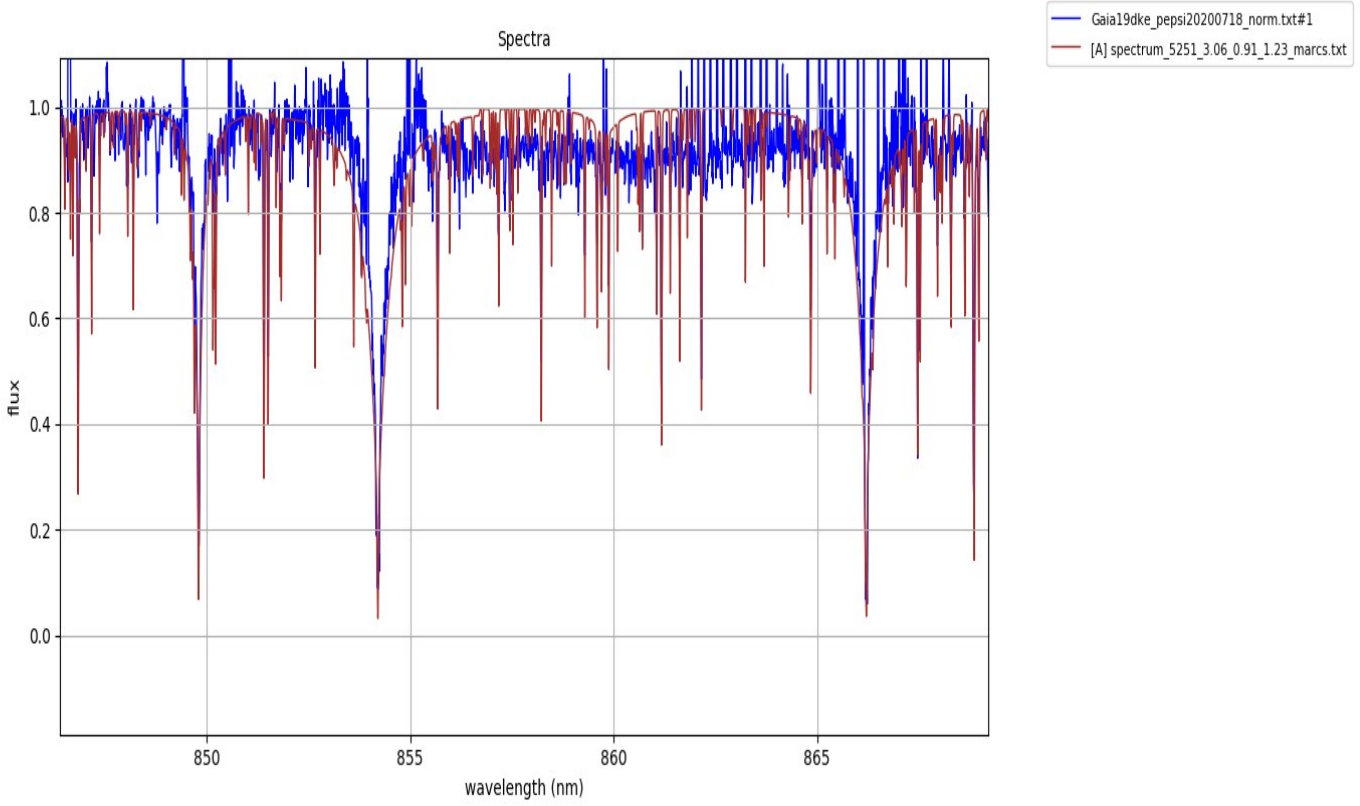
Spectroscopic follow-up

The Large Binocular Telescope Observatory (LBTO) is located in southeastern Arizona at an altitude of 3200m. The binocular design of the Large Binocular Telescope (LBT) has two identical 8.4m telescopes mounted side-by-side on a common altitude-azimuth mounting for a combined collecting area of a single 11.8m telescope.

PEPSI is the bench-mounted, two-arm, fibre-fed and stabilized Potsdam Echelle Polarimetric and Spectroscopic Instrument for the (LBT). Spectral resolutions (R~65000) cover the entire optical/red wavelength range from 383 to 907 nm

PEPSI

Results of spectroscopic analysis of LBT/PEPSI data

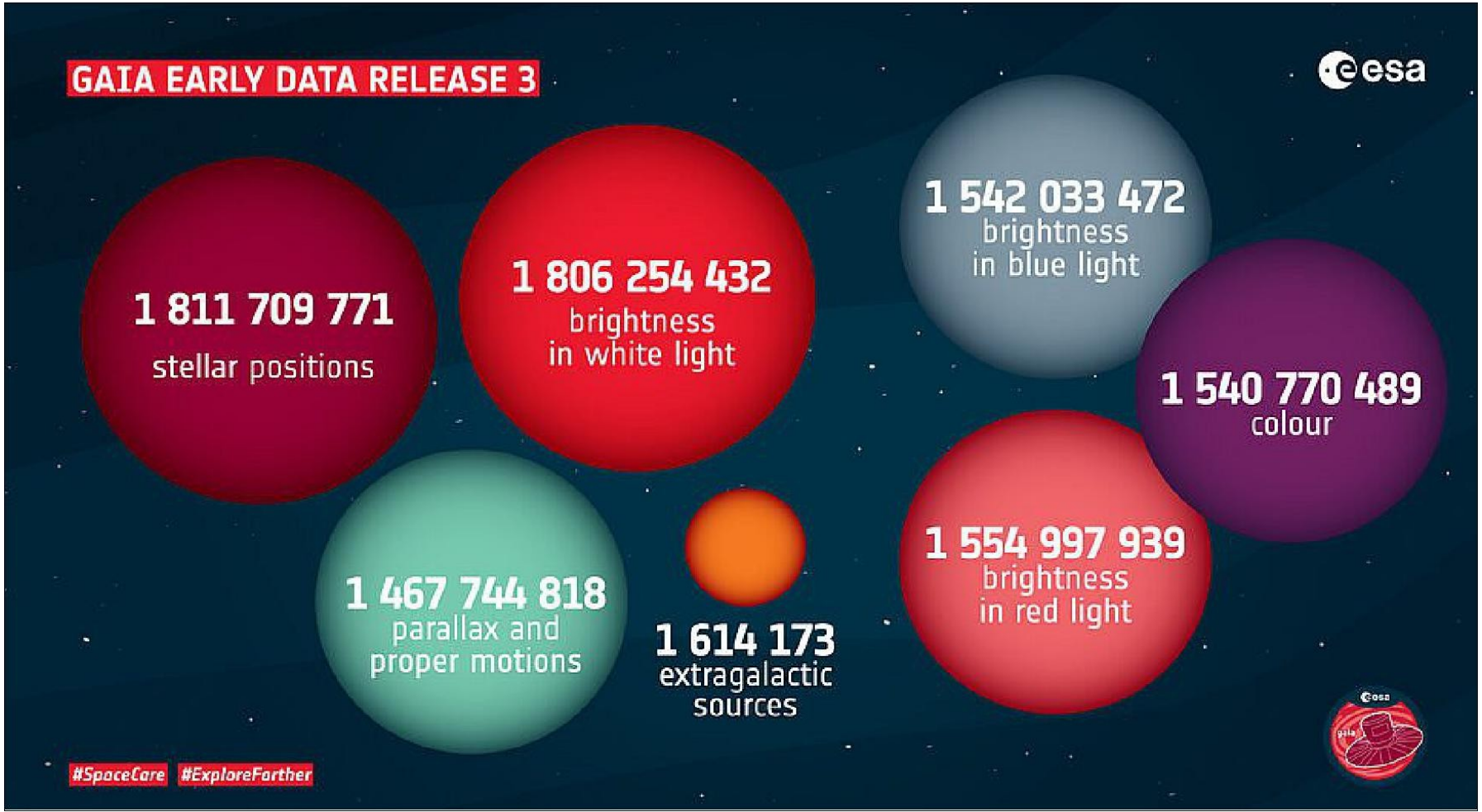


Teff = 5251 +/- 25 K

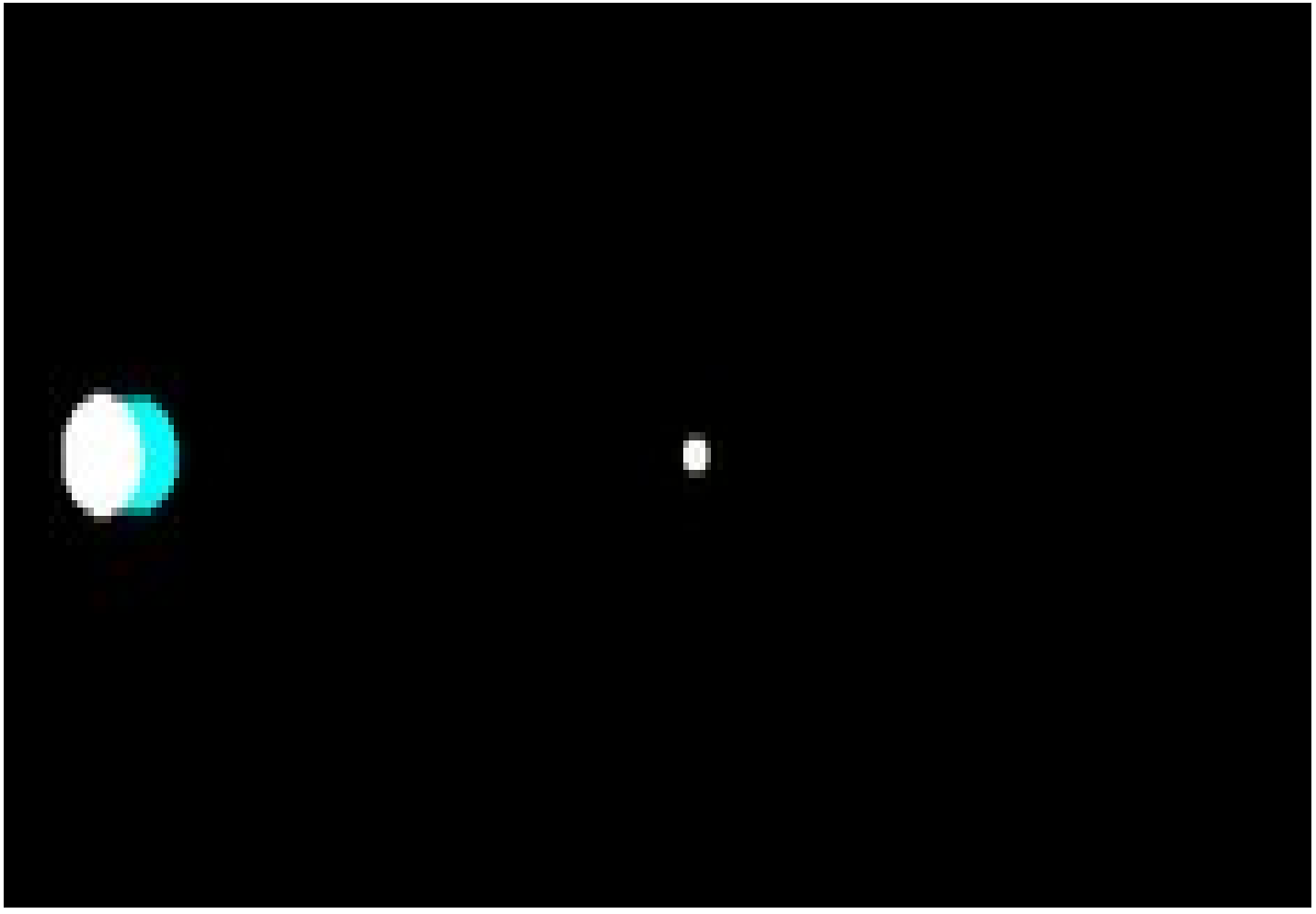
logg = 3.06 +/- 0.02

G5 III, metal-rich star.

Can we trust precision of parallax measurements then were microlensing event ???



Microlensing Animation



Value of the source star distance

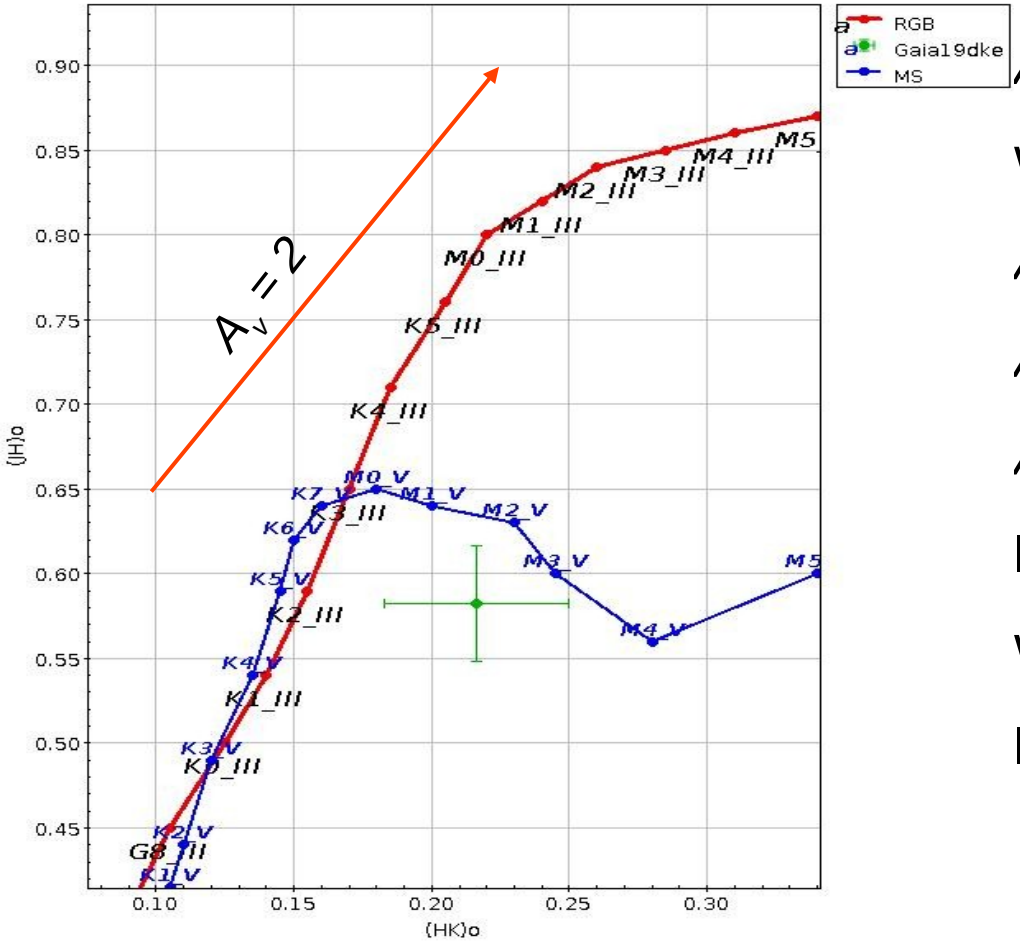
Distance calculated from Gaia parallax measurements DR2 (7.6 kpc) and DR3 (9.5 kpc)

Spectrophotometric method is one of the most widely used to determine distance. The method is based on equation:

$$m_v - M_v - A_v = 5\log d - 5 \qquad (1)$$

G5 III, metal-rich star. Using parametres Mv = 1.0 mag, and assuming V = 16 mag (at baseline) and extinction value Av = 1.1 mag (Schlegel+98) calculated distance to the source d ~ 6.0 kpc.

The extinction and distance based on 2MASS photometry



$A_{Ks} = 0.67 E_{J-Ks}$ (2)

Where $(J-K_s)_0 = 0.49$ *mag.*

$A_{ks} = 0.21$ *mag.*

$A_v = 8.3\, A_{Ks}$ (3)

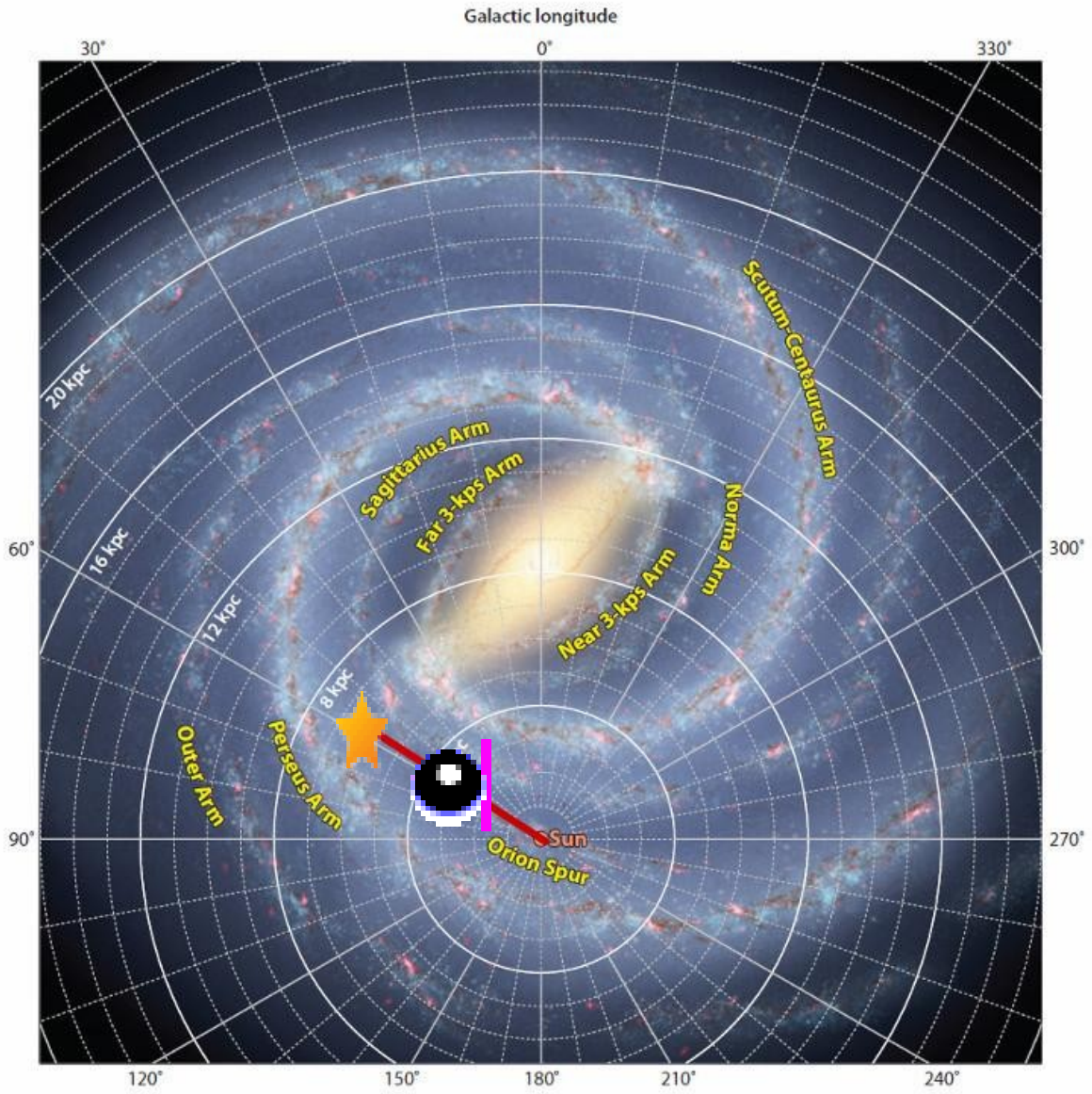
$A_V = 1.7$ *mag.*

$\log d = 0.2\,(K_s - M_{Ks} + 5 - A_{ks})$ (4)

Where M_{Ks} = -1.6 mag.

$\log d = 3.788$

d = 6.1 kpc



Preliminary results

Source star G5 III, metal-rich.

Av = 1.1 mag

A_{ks} = 0.21 *mag*.

Distance to the source d ~ 6.0 kpc.

The mass of the lens less then $1M_{\odot}$

Acknowledgements

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Erika Pakštienė, Justas Zdanavičius, Vytautas Čepas, Kotryna Šiškauskaitė, Rimas Janulis, Rūta Urbonavičiūtė.

All observers of the event ***Gaia19dke,***

European space mission **Gaia**

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Thank you for your attention

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