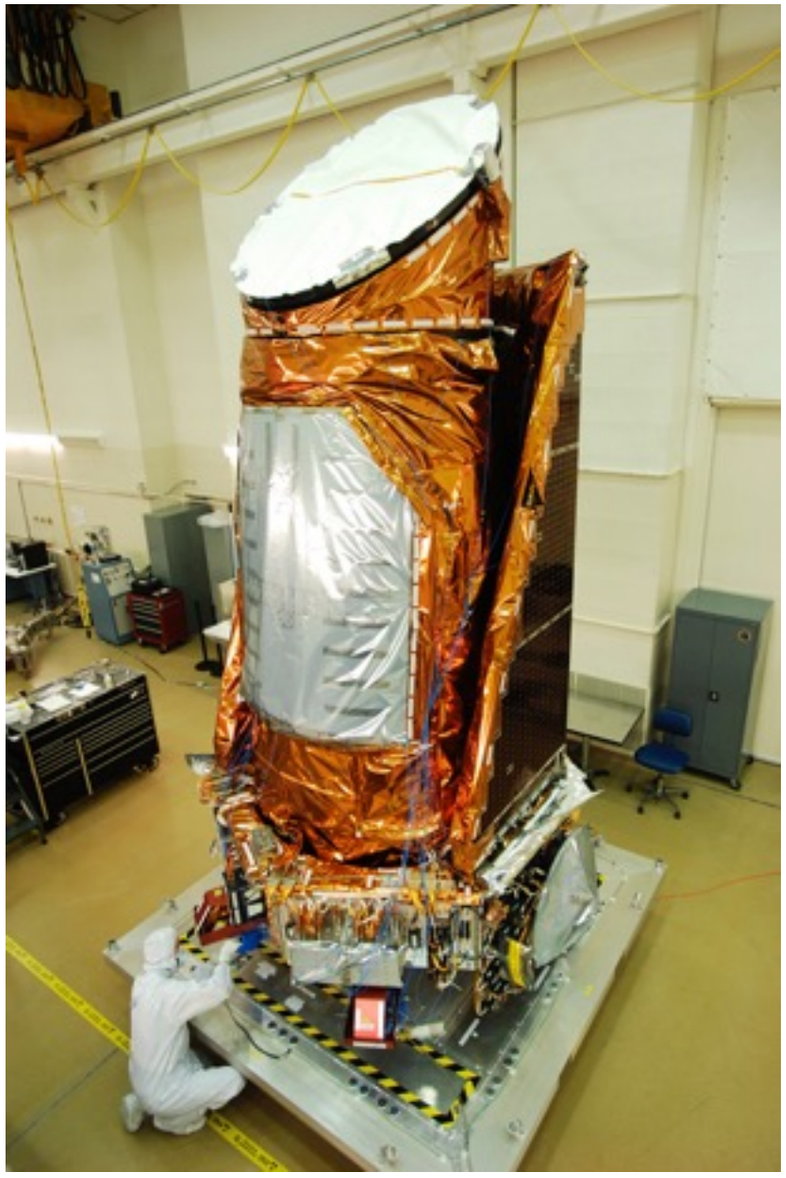
The K2 Campaign 9 Microlensing Experiment

*A talk by **Geert Barentsen** for the 21st Microlensing conference in Pasadena on 3 Feb 2017.*

K2 Guest Observer Office
http://keplerscience.arc.nasa.gov

Kepler was launched on 6 March 2009



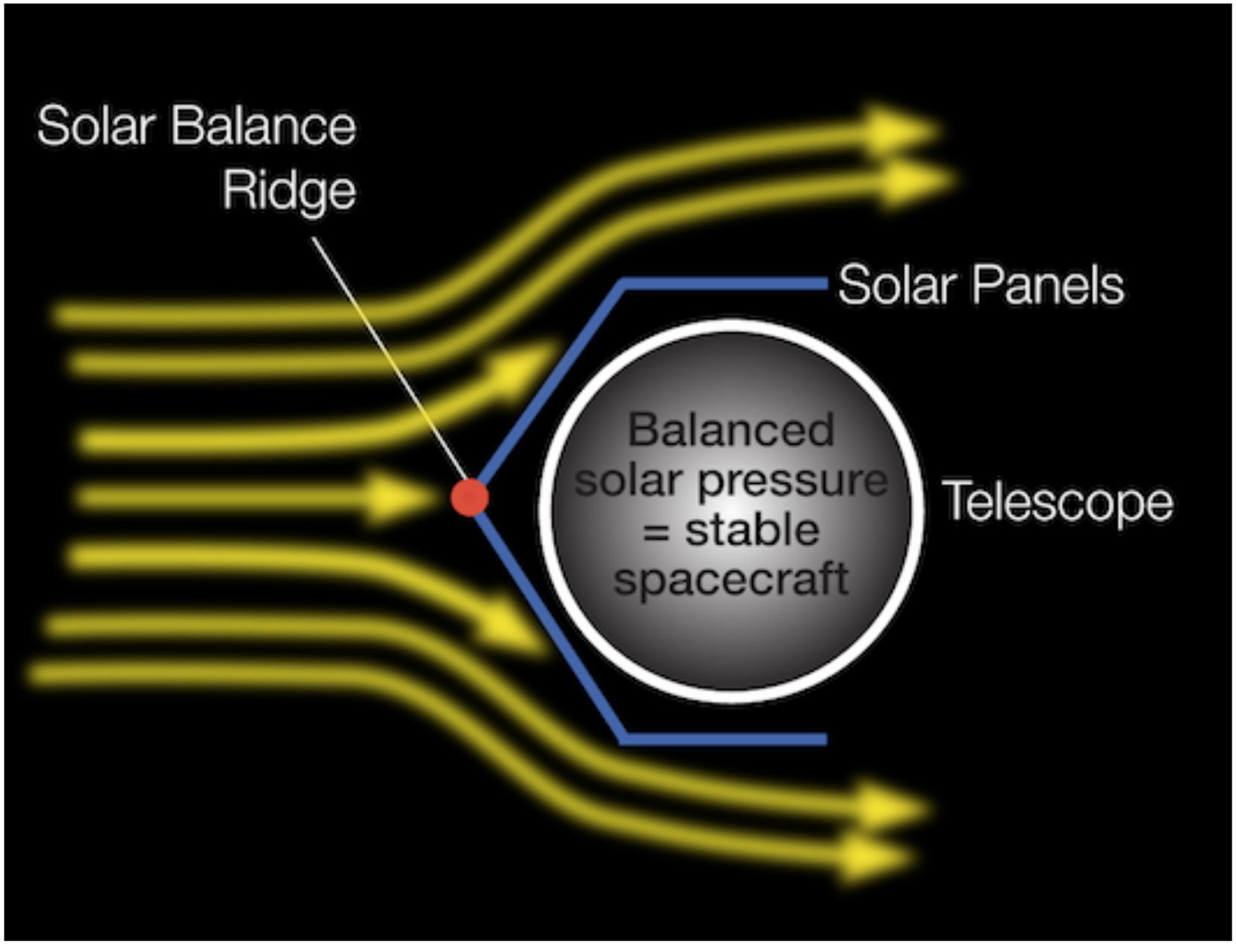
100 Mpixel array (100 deg^2)
4 arcsec pixels
1 or 30 min cadence
wide passband (V+R+I)

0.95-m Schmidt

NASA K2

Due to the loss of two reaction wheels, Kepler is now kept stable by balancing solar radiation on its solar panels

=> K2 Mission

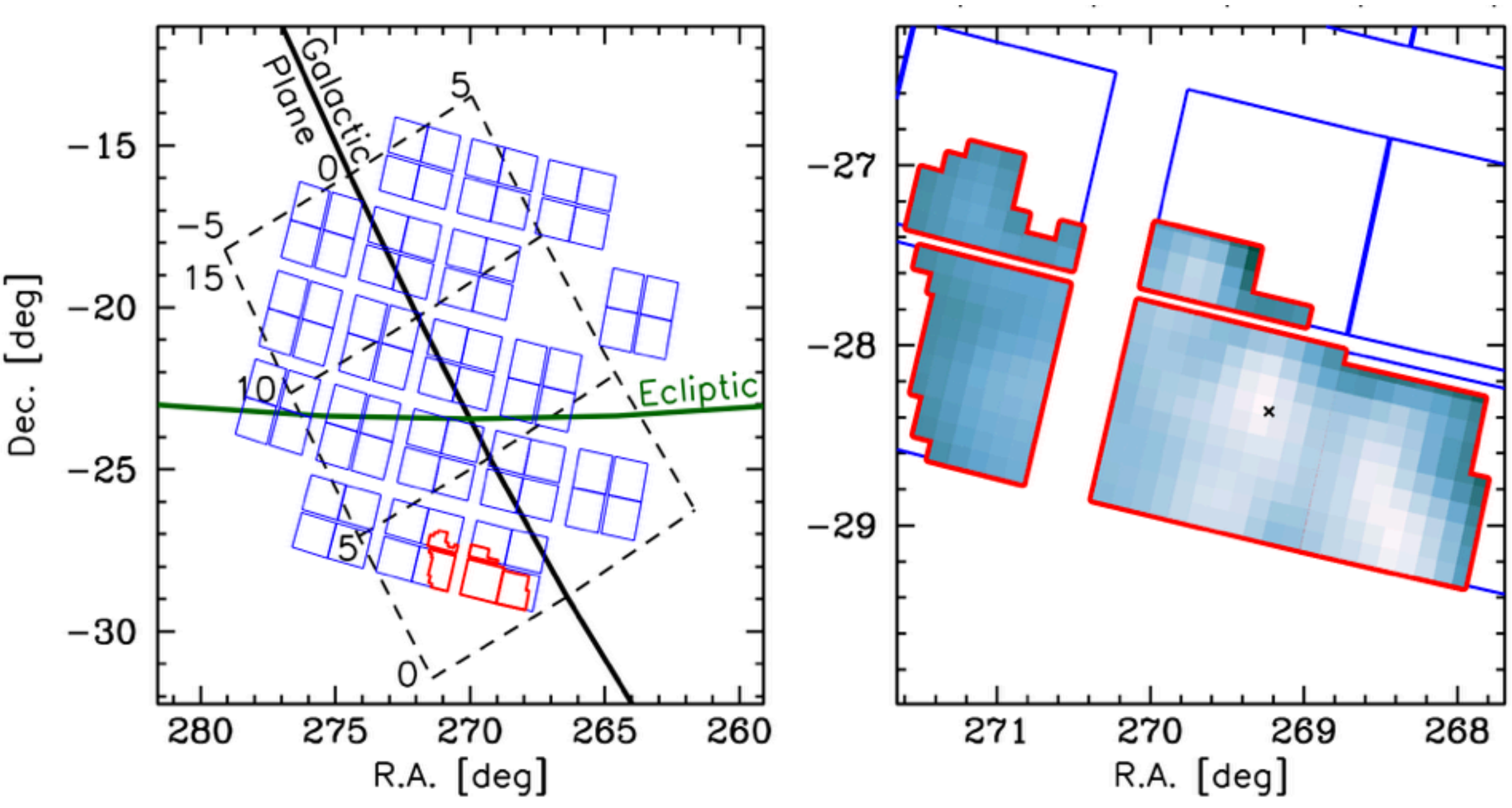


K2 Campaign 9 monitored the Bulge

9

Apr-Jul
2016

K2 C9 monitored 3.7 deg^2 of the Bulge for ~70 days using 30-min cadence

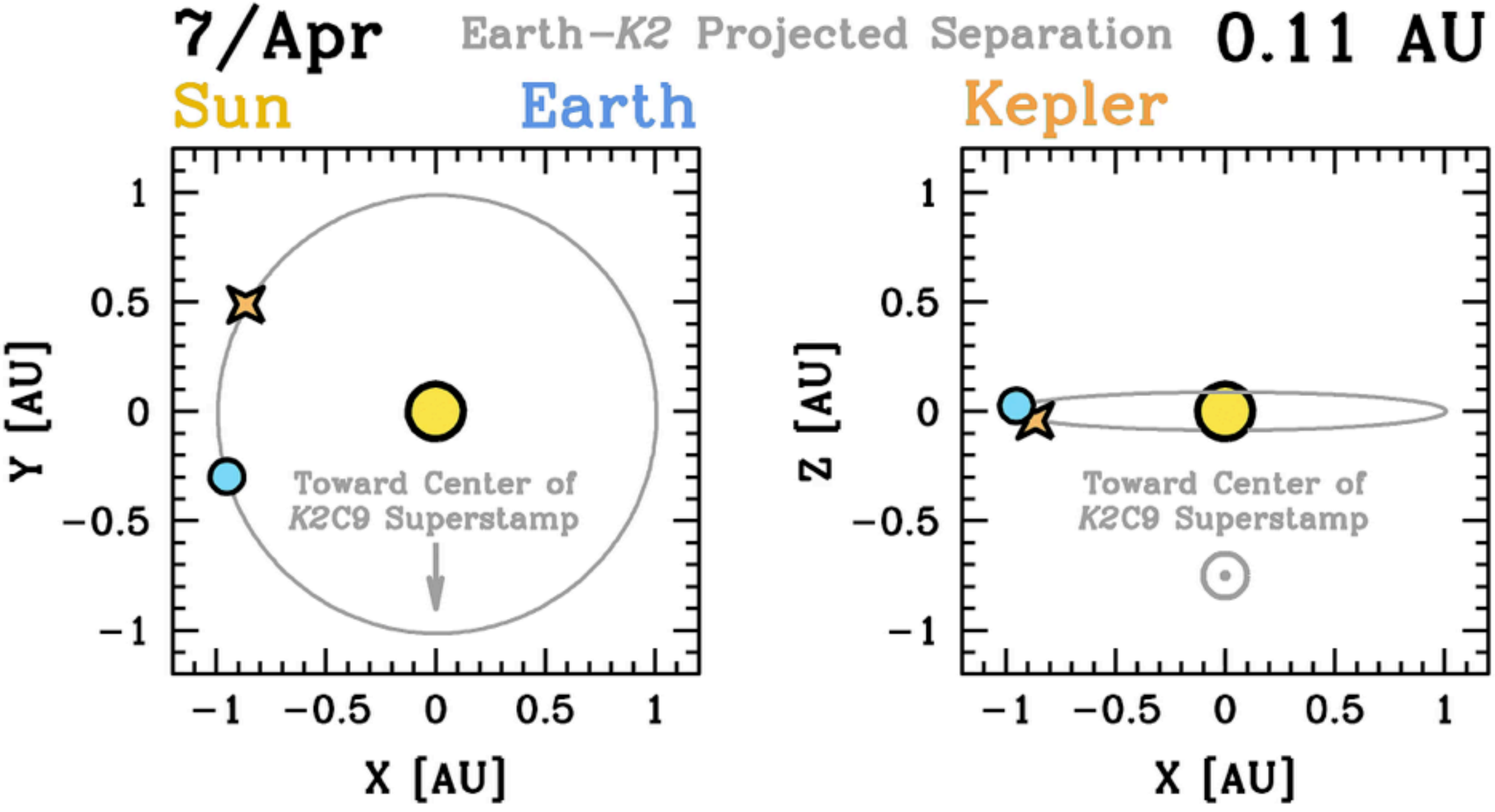


Henderson et al (2016); survey area selected following Poleski (2016).

Why care about K2 C9?

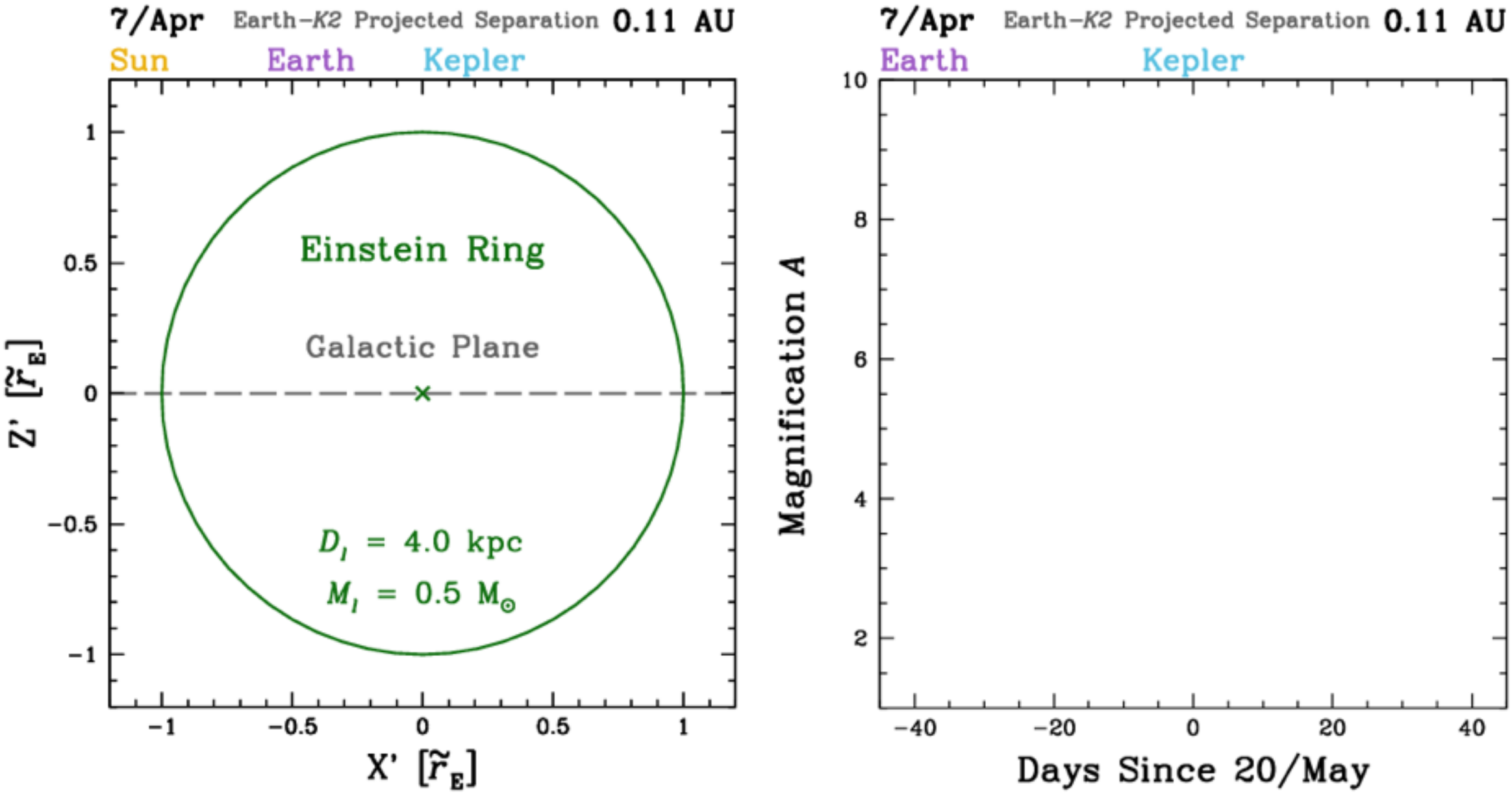
- First large, automated, space-based ulens survey
  - Satellite parallaxes for short-lived events; free-floating planets?
  - Galactic distribution of exoplanets
- A data set that is fully public
- Synergy with Spitzer
  - ~25+ targets shared with K2C9, ~33 with K2C11
- Excellent practice for WFIRST
  - Length of observing season (~72 d)
  - Coordination of ground and space

Orbital motion



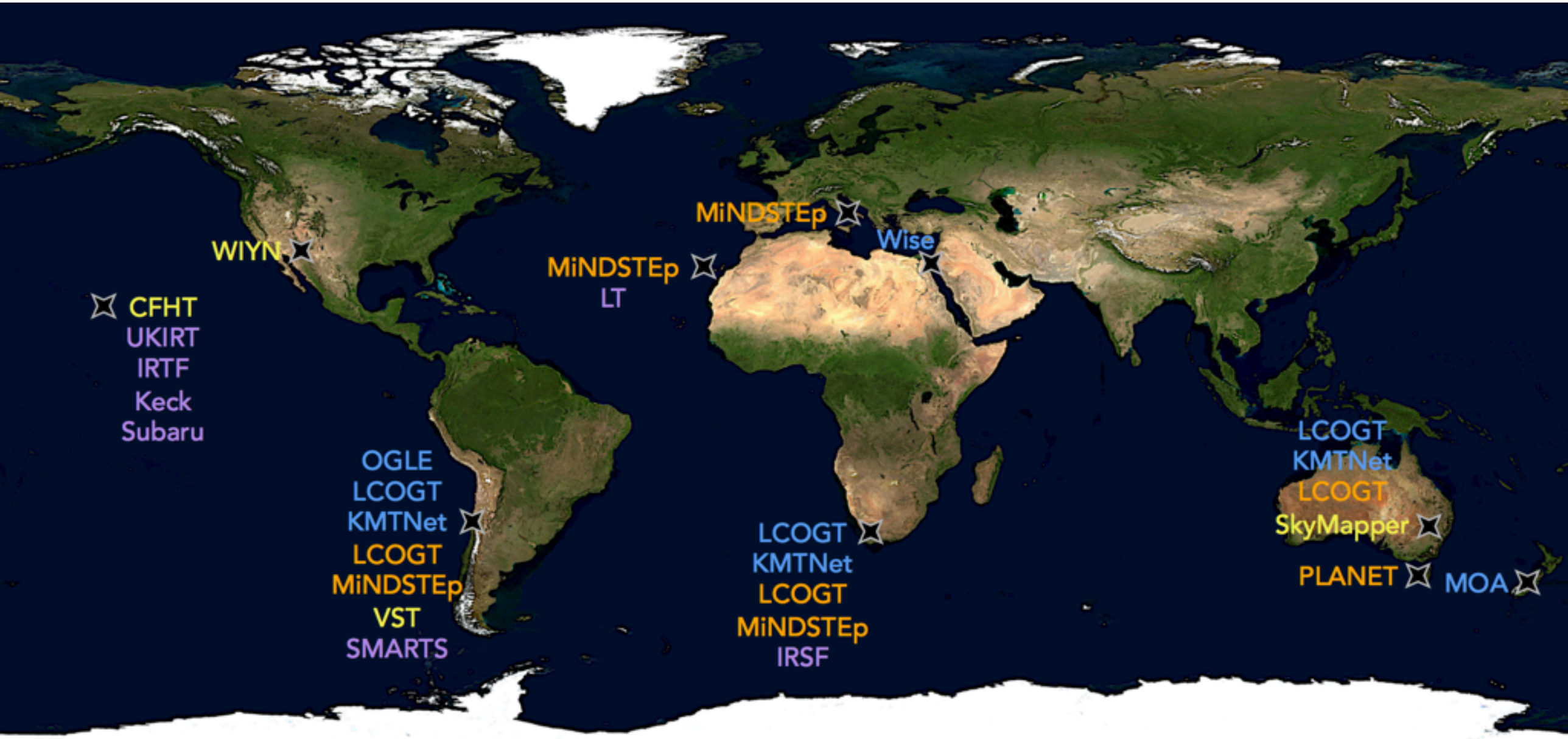
Credit: Calen Henderson
(http://www.astronomy.ohio-state.edu/~henderson/k2c9_parallax_animations)

Simulated event



Credit: Calen Henderson
(http://www.astronomy.ohio-state.edu/~henderson/k2c9_parallax_animations)

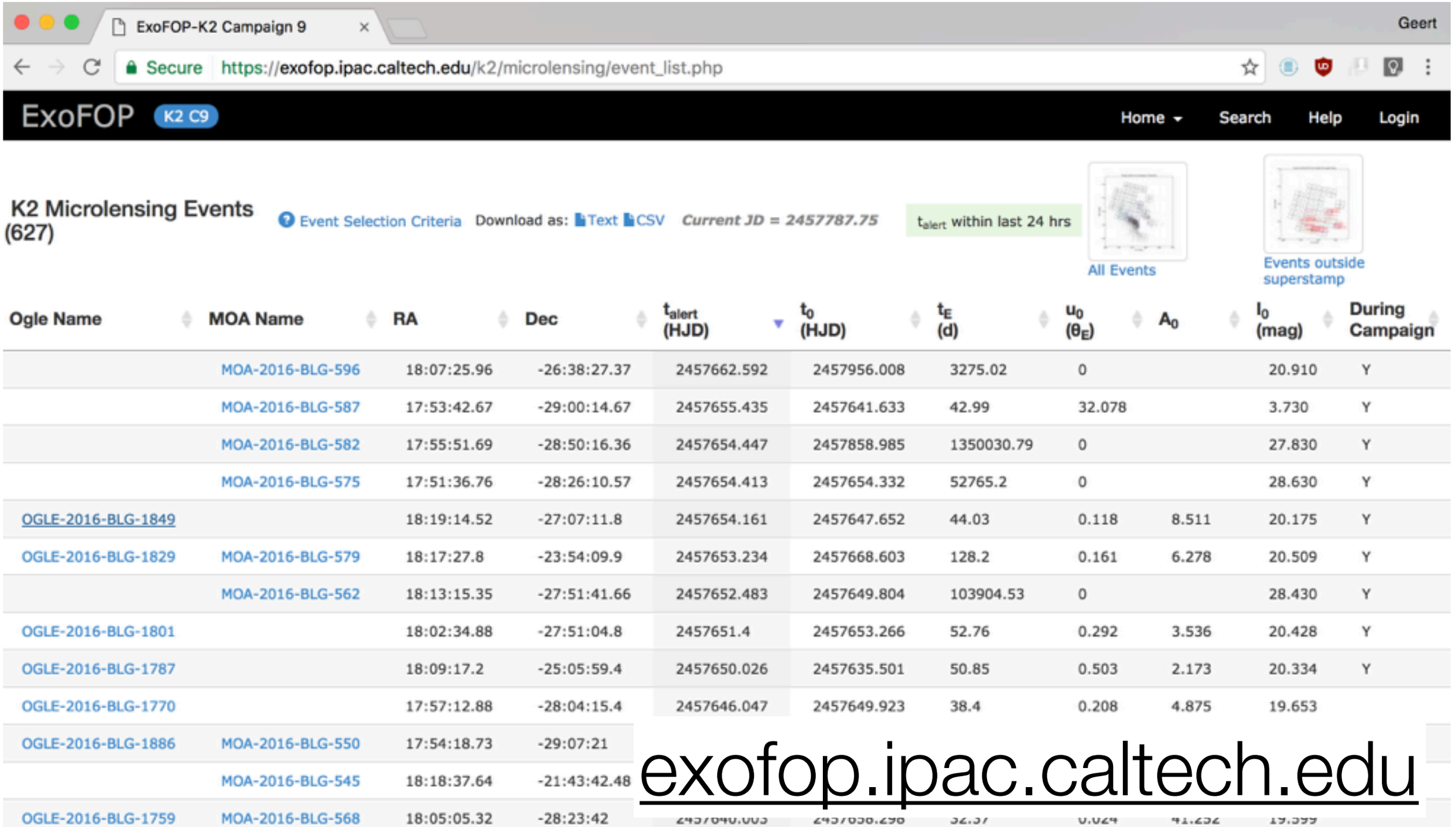
Many ground-based facilities monitored the K2 C9 field — thank you!



Henderson et al (2016)

Coordination via K2 C9 ExoFOP (NExScI)

=> See poster by Rachel Akeson!



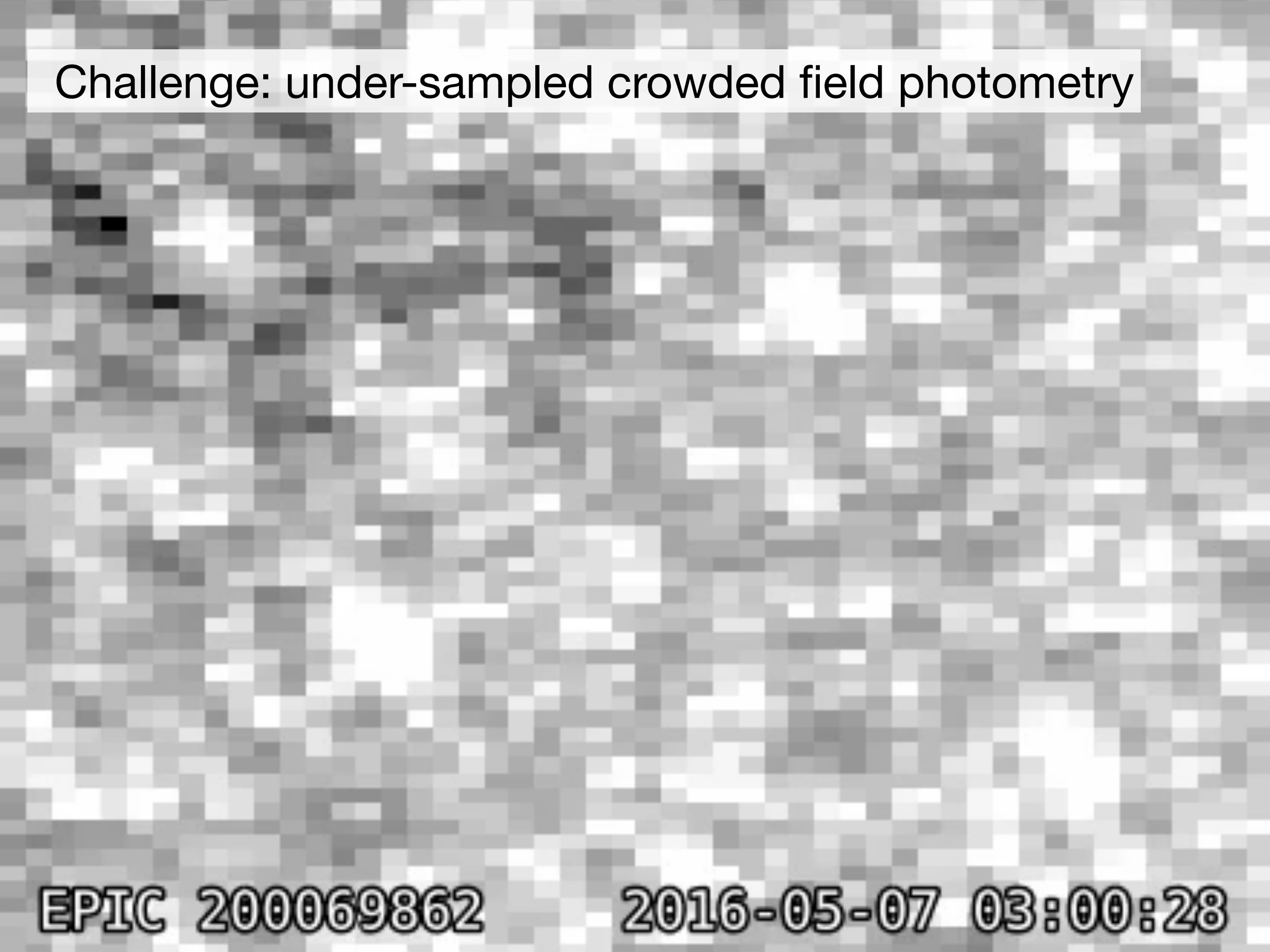
exofop.ipac.caltech.edu

K2 C9 Science Team

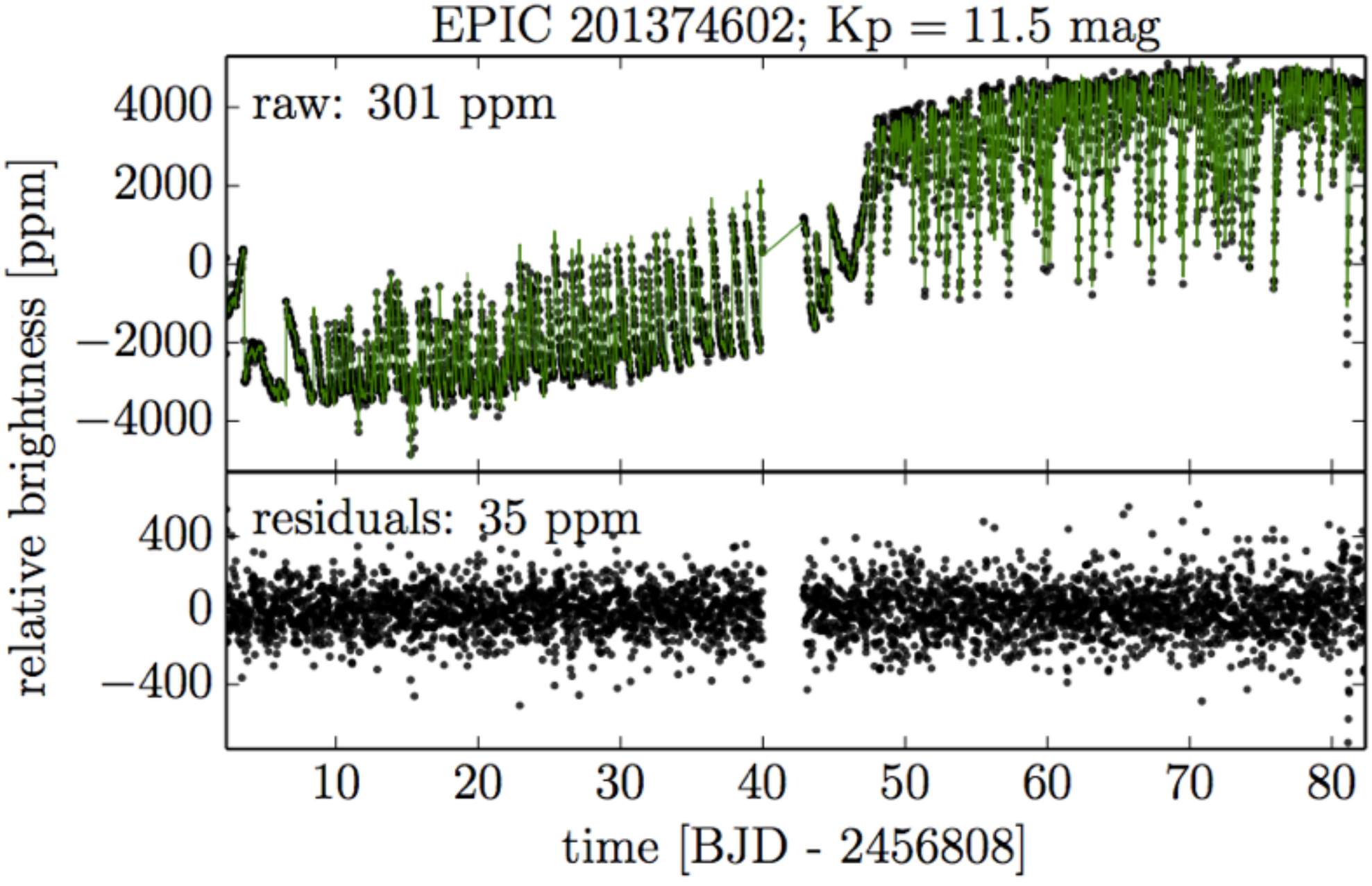
- To maximize the scientific return, NASA funded a K2 C9 Microlensing Science Team.
- PIs: Bennett, Henderson, Hogg, Penny, Street + Poleski (C11).
- The team was recruited to …
  - help plan the K2 observations; ✓
  - facilitate coordinated ground-based observations; ✓
  - detect and characterize the events observed by K2. ***ongoing***
- Value-added products are expected to become public.

So what does the data look like?

Challenge: under-sampled crowded field photometry

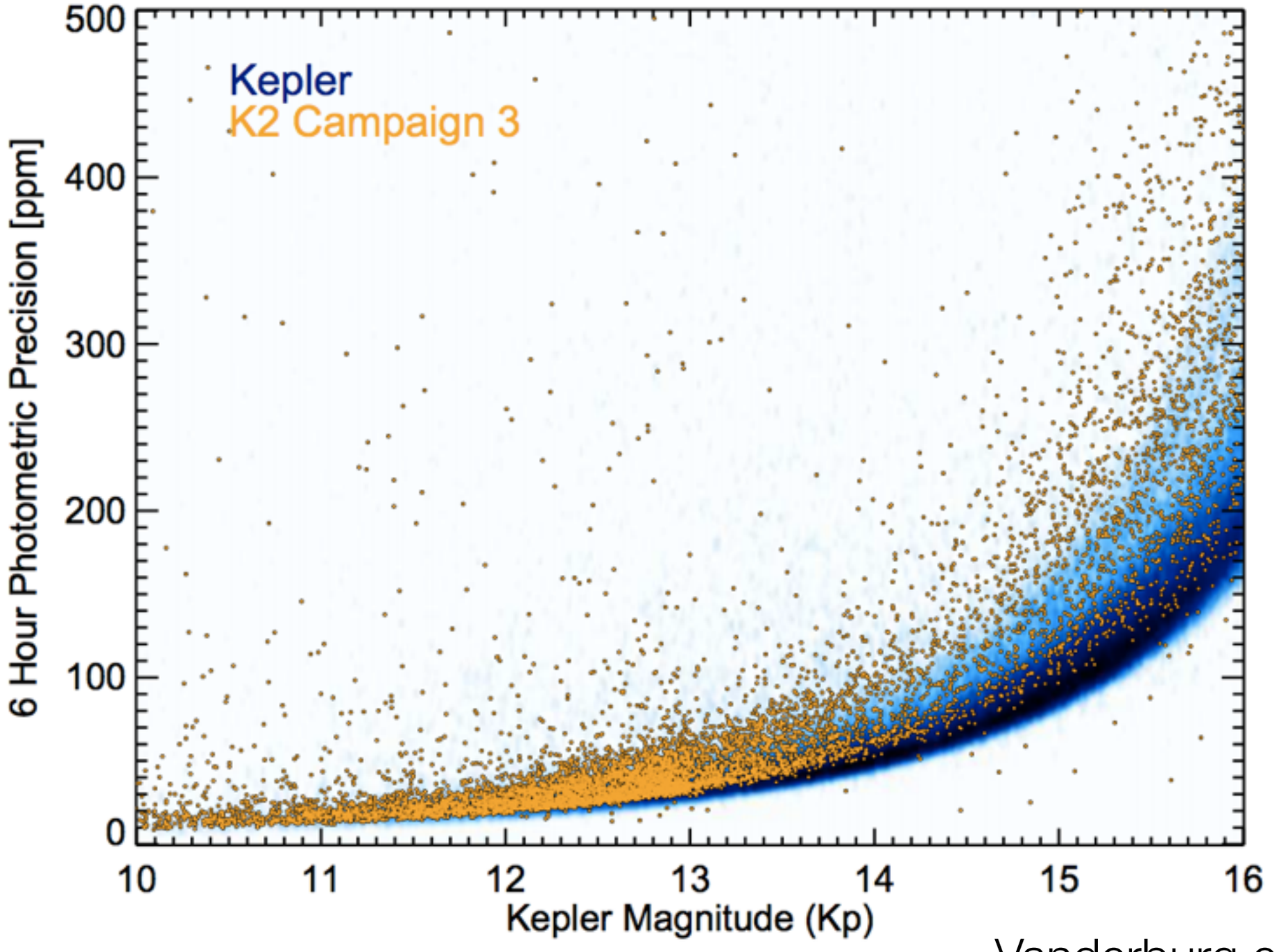


K2's roll motion introduces millimag-level systematics, which can be removed by modeling the noise.



Foreman-Mackey et al. 2015

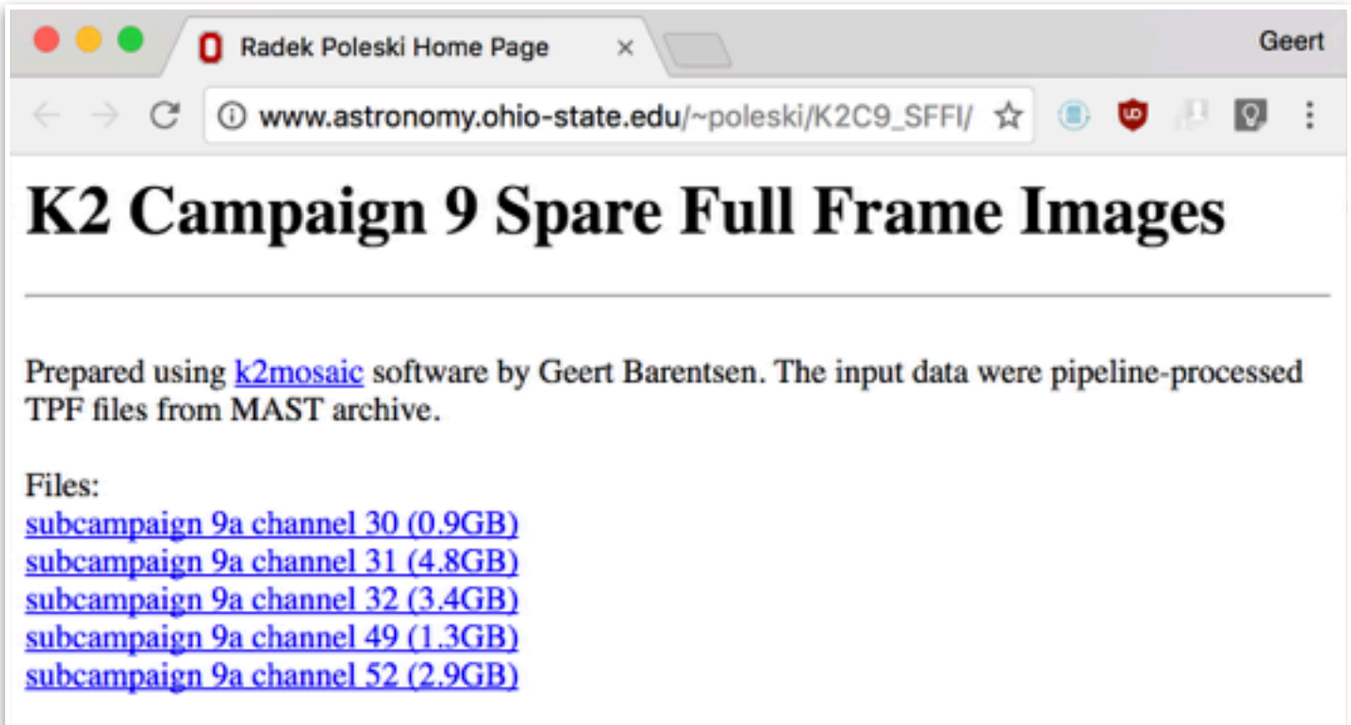
After systematics removal, the photometric performance of K2 is in family with Kepler



Vanderburg et al. 2015

Data products

- All K2C9 data are now publicly available at MAST
  - http://archive.stsci.edu/k2
- “Target Pixel Files” provide time series for ~1000 pixels at a time
- User-friendly FITS images are being created by Radek Poleski
- http://www.astronomy.ohio-state.edu/~poleski/K2C9_SFFI/



How to get involved?

Join the mailing list:
k2-microlensing@lco.global (Rachel Street)

Visit ExoFOP:
https://exofop.ipac.caltech.edu/k2/microlensing

Talk to Rachel, Radek, Calen, Dun, Matt, Dave++

Apply for ADAP funding to work on K2C9!
(US-based institutions only)

K2 C9 offers an opportunity to put microlensing even more on the radar

Please keep us informed of interesting results in the pipeline!

Kepler K2

NASA

KEPLER&K2 2017 SciConIV: LEGACY&SCION

JUNE 19-23 2017

NASA Ames Research Center
Moffett Field, CA

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