

by

**EUROPEAN ASTRONOMICAL
SOCIETY
ANNUAL MEETING**





The Gaia Mission: status and upcoming third data release

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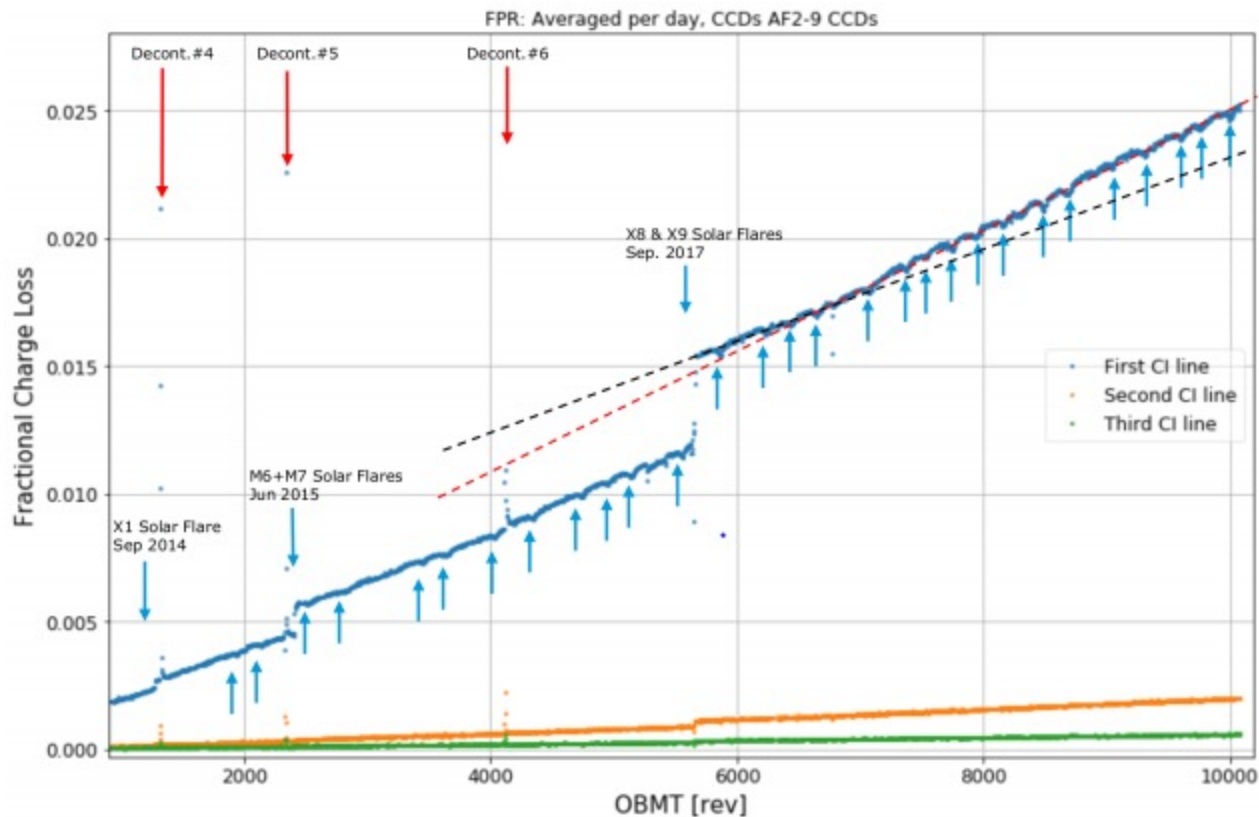


Mission, Spacecraft and Payload Status

- Operations are nominal and smooth
- minor disturbance (micrometeoroids, micro-clanks, fuel movements) which can be modelled in the astrometric solution
- Estimated depletion of propellant for micro-propulsion system is Jan-Apr 2025
- Mission formally extended to end 2022, with indicative approval to end 2025
- Request for definitive approval to end 2025 will be on ESA SPC agenda for 2022

Radiation Damage Evolution

Evolution of CTI induced charge loss in terms of FPR.



credit C. Crowley

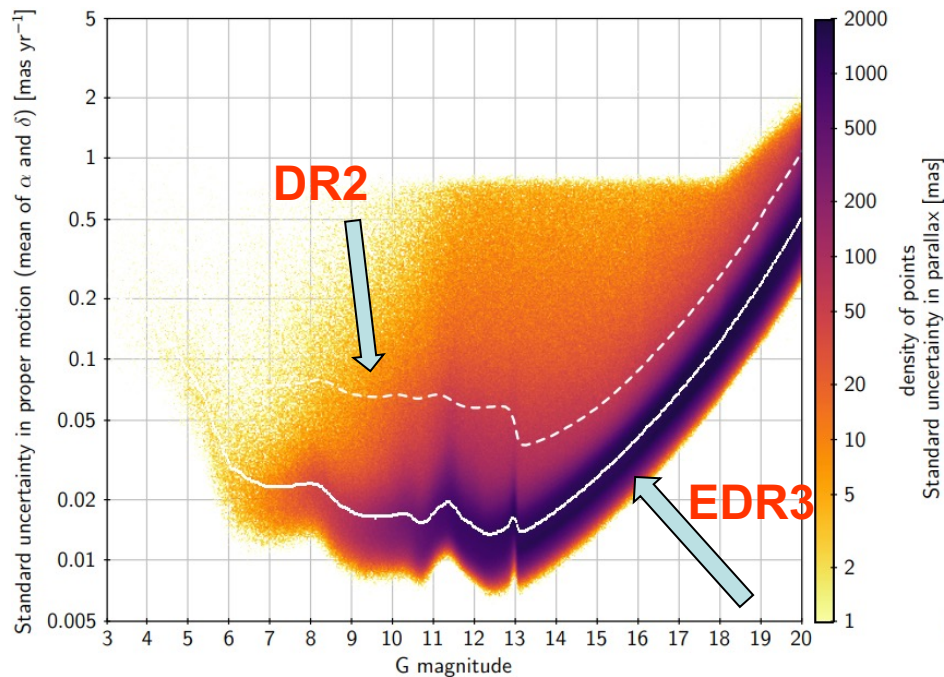
CTI is still a factor 7 below pre-launch predictions

DR3 Content

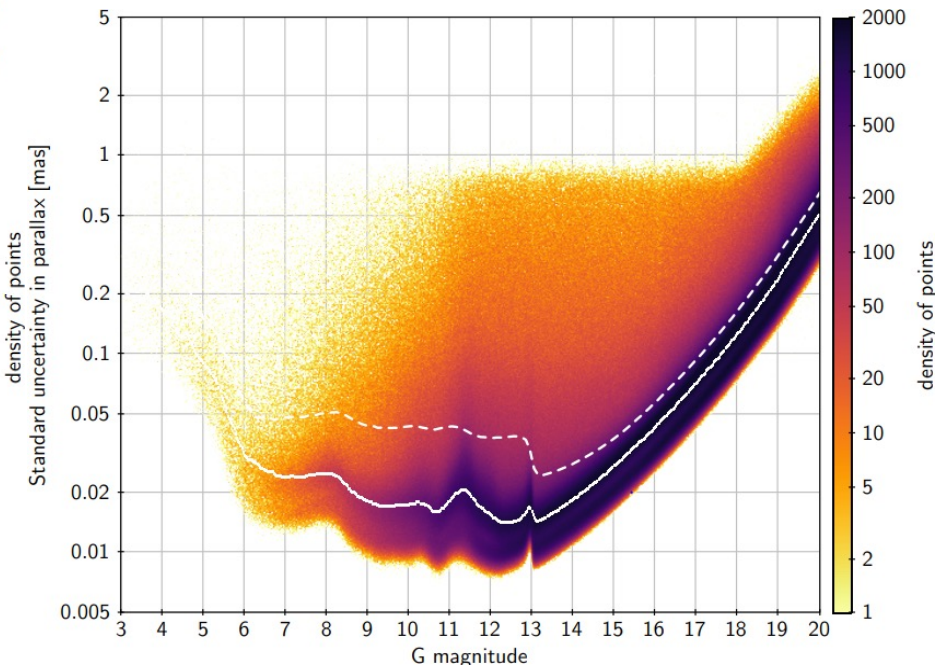
- Expected Mid-2022 and will include:
 - Gaia DR3 contents:
 - Object classification and astrophysical parameters (about $10^{8/9}$ objects)
 - BP/RP spectra ($10^{8/9}$, $G < 17.6$) and RVS spectra (about 1M) for well-behaved objects.
 - Mean radial velocities ($GRVS < 14$; about 33M).
 - Variable-star classifications and epoch photometry used for the stars.
 - Solar-system results with preliminary orbital solutions and individual epoch observations.
 - Non-single stars (a few 10^5)
 - Quasars, galaxies (a few 10^6) and Extended Objects results
 - Gaia Andromeda Photometric Survey (GAPS), consisting of the photometric time series for *all* sources located in a 5.5 degree radius field on the Andromeda galaxy (1M)
- see focused talks during this meeting

Astrometry from Gaia DR2 to EDR3

Proper Motions



Parallaxes



BP RP spectra

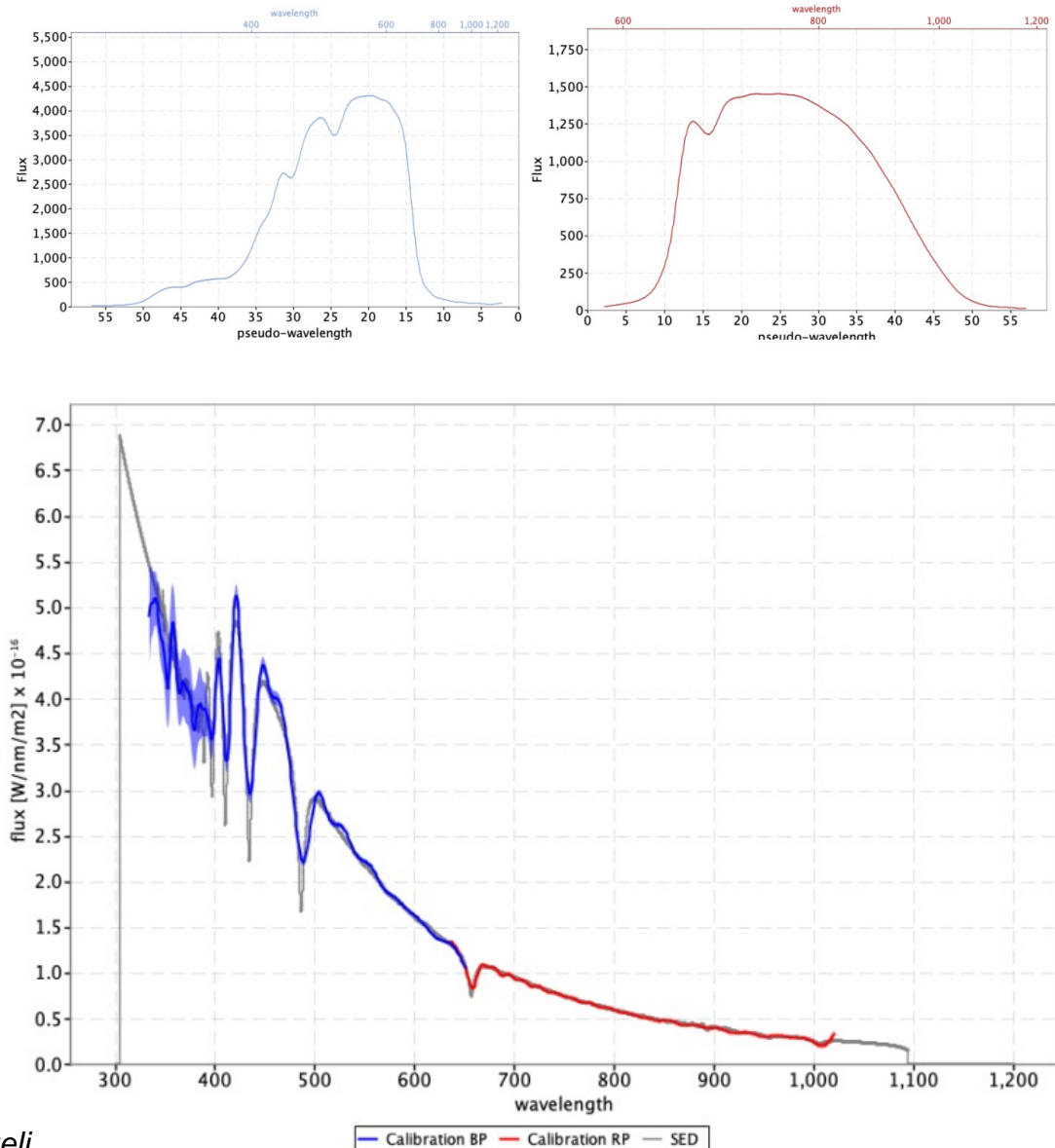
Internally-calibrated spectra



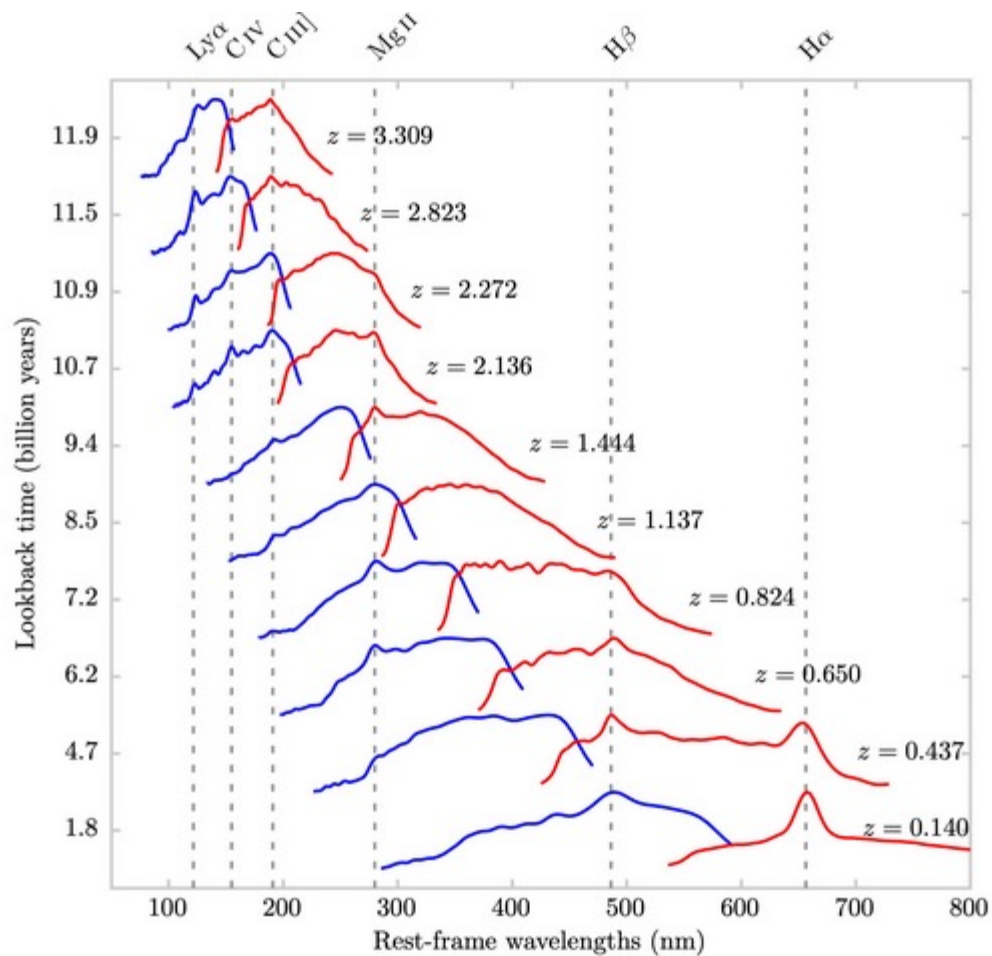
External instrument calibration



Externally-calibrated absolute spectra

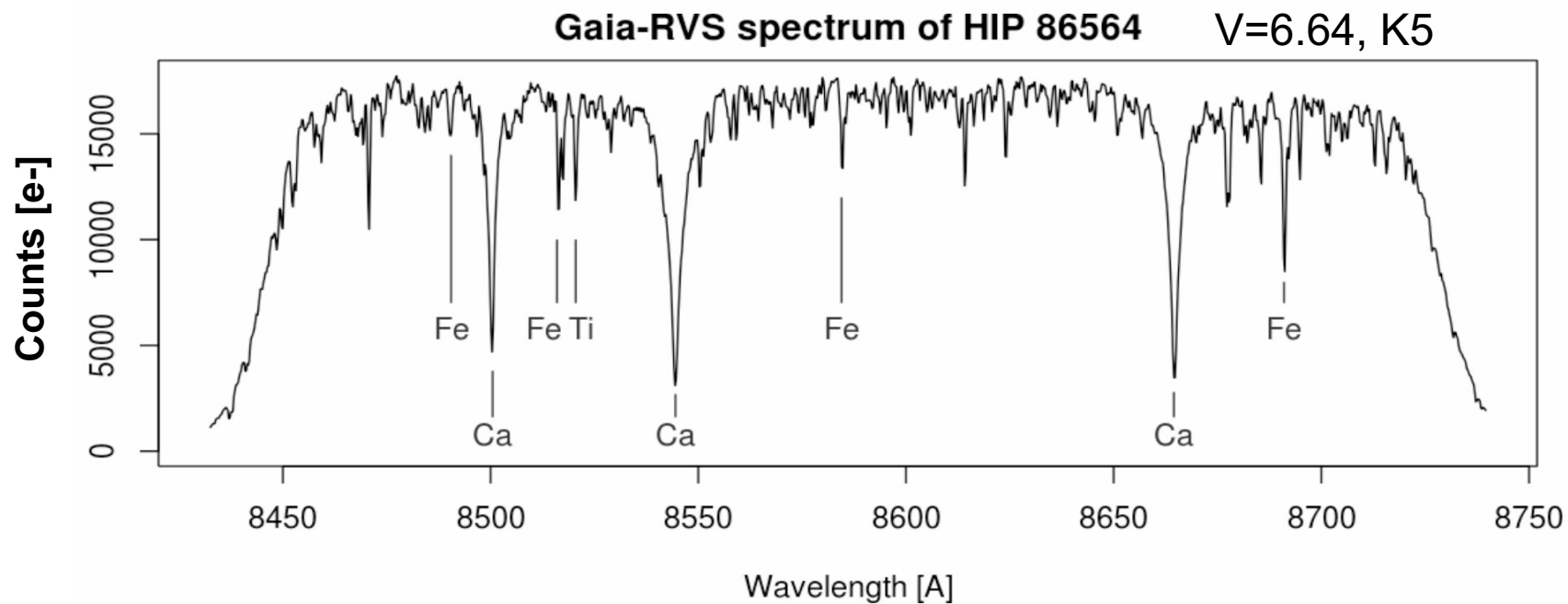


BP RP spectra of QSOs



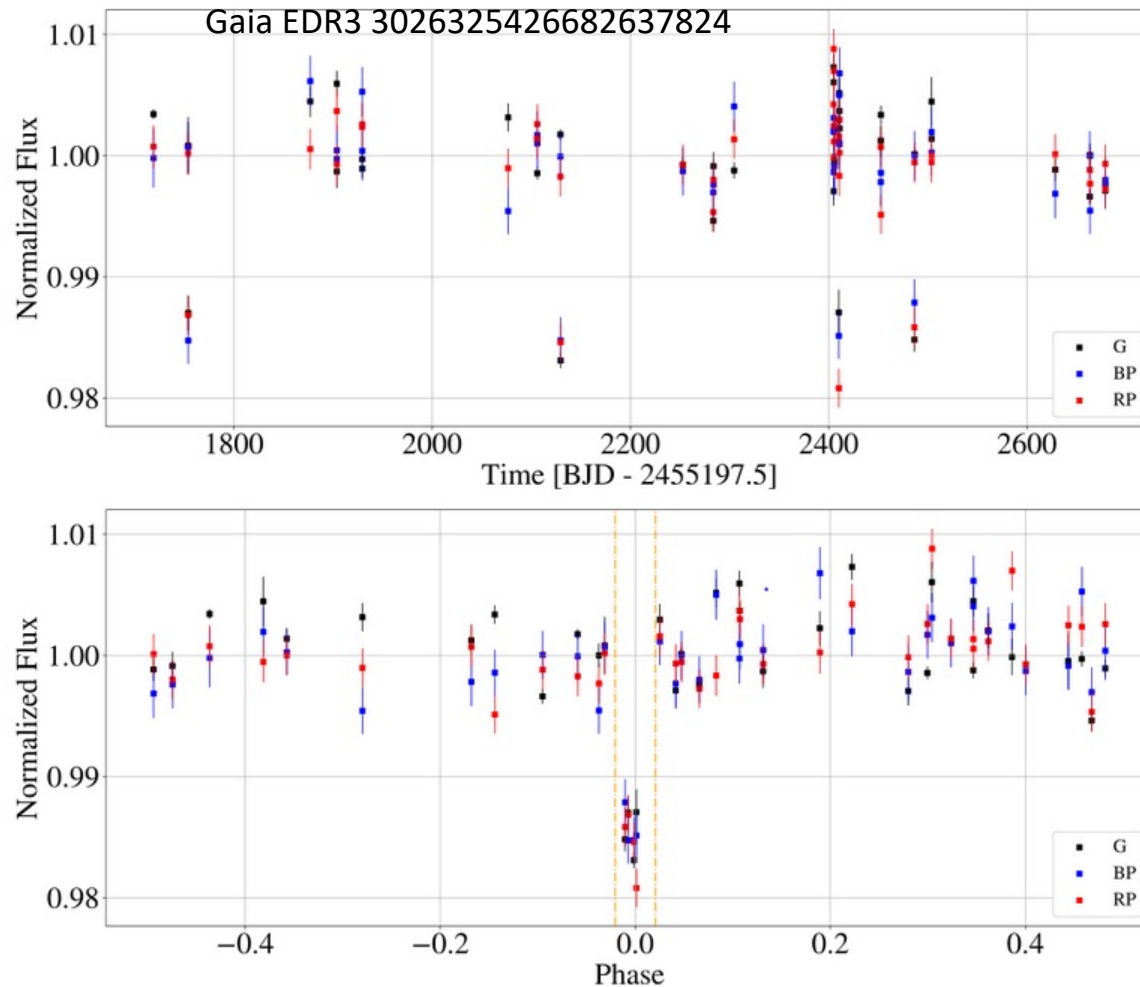
Credit: L. Delchambre, R. Andrae, M. Fouesneau, O. Creevey, R. Sordo.

RVS spectra



Credits: ESA/Gaia/DPAC/ P. Sartoretti & CU6 Team, A. Vallenari

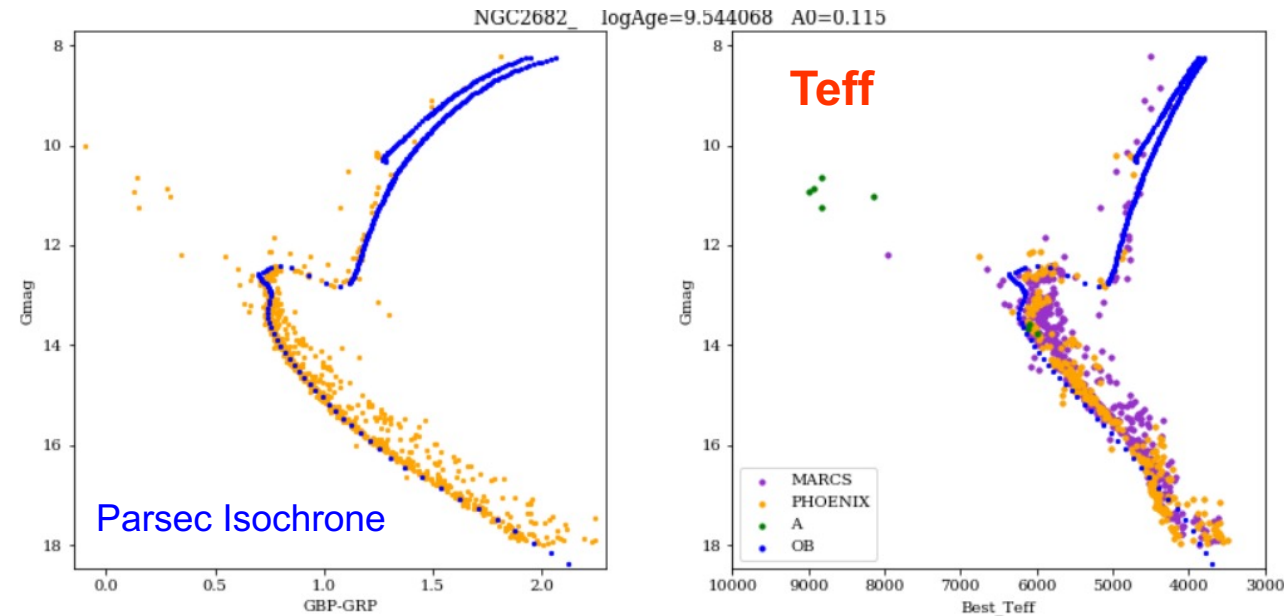
First transiting exoplanet from Gaia



$P = 3.0525 \pm 0.0001$ d
 $\text{Mass} = 1.1 \pm 0.1 M_J$

Credits: ESA/Gaia/DPAC/CU7/TAU+INAF, Aviad Panahi, Shay Zucker, G. Clementini et al

A preview of astrophysical parameters

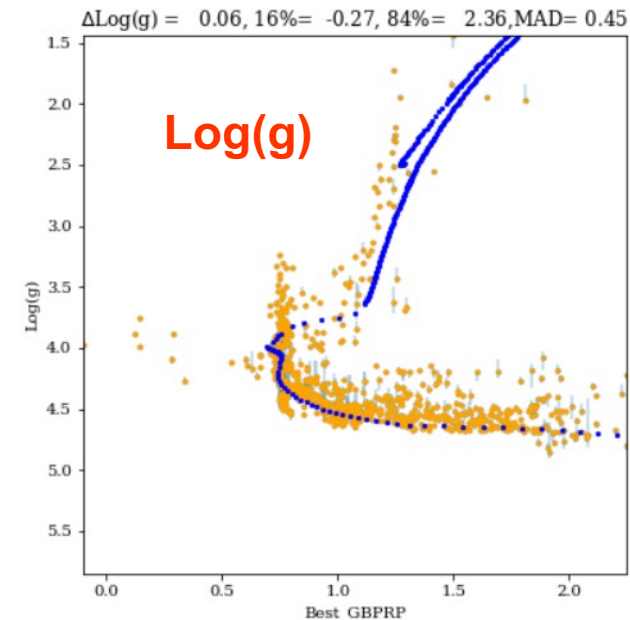


$\Delta T_{\text{eff}} (T_{\text{eff}} > 4000) = -93\text{K}$,
MAD = 118

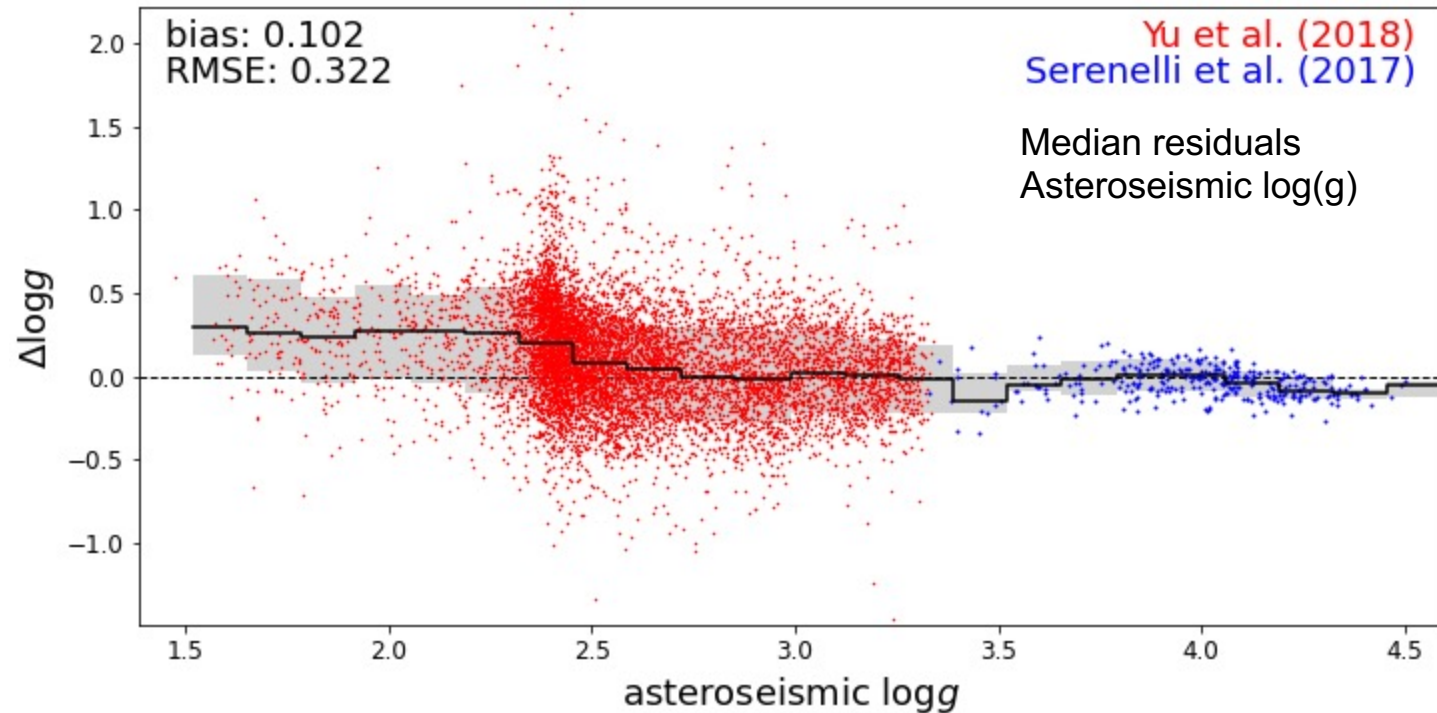
- M67 stars classified using BP RP spectra

→ APs from BP/RP spectra → ~500M stars

➡ O. Creevey talk



Comparison with asteroseismic $\log(g)$



Long term Planning

- DR4 not before end 2025, possibly later, including the full release of the nominal mission
 - Full astrometric, photometric, and radial-velocity catalogues.
 - All available variable-star and non-single-star solutions.
 - Source classifications (probabilities) plus multiple astrophysical parameters (derived from BP/RP, RVS, and astrometry) for stars, unresolved binaries, galaxies, and quasars. Some parameters may not be available for faint(er) stars.
 - An exo-planet list.
 - All epoch and transit data for all sources
- DR5 not before end 2028
- Intermediate focused product release
- Even longer term planning: Gaia-NIR (see David Hobbs talk)



Thank you for your attention