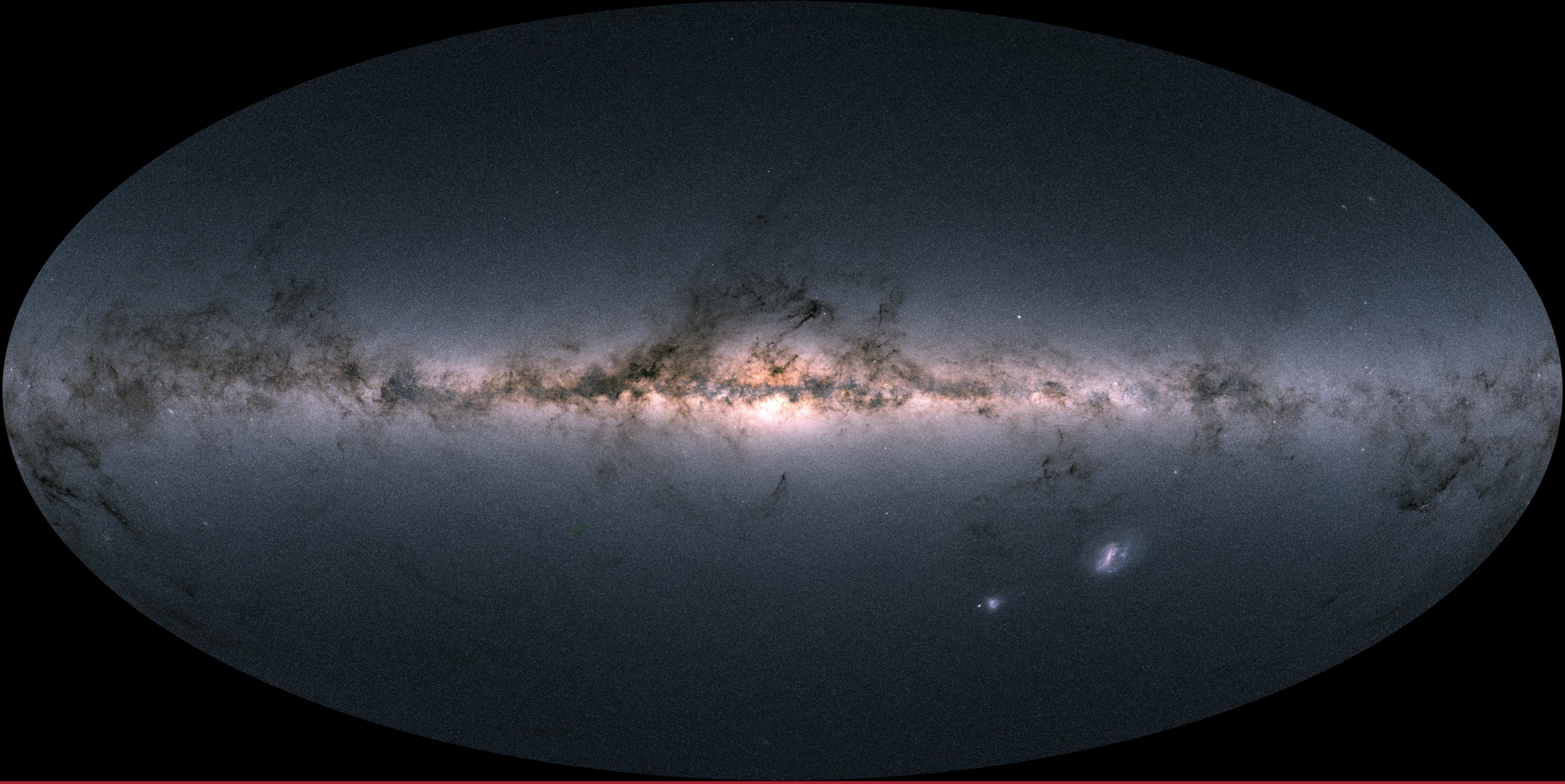


Gaia mission status

Timo Prusti

Gaia mission status

Gaia spacecraft is fine and operating nominally

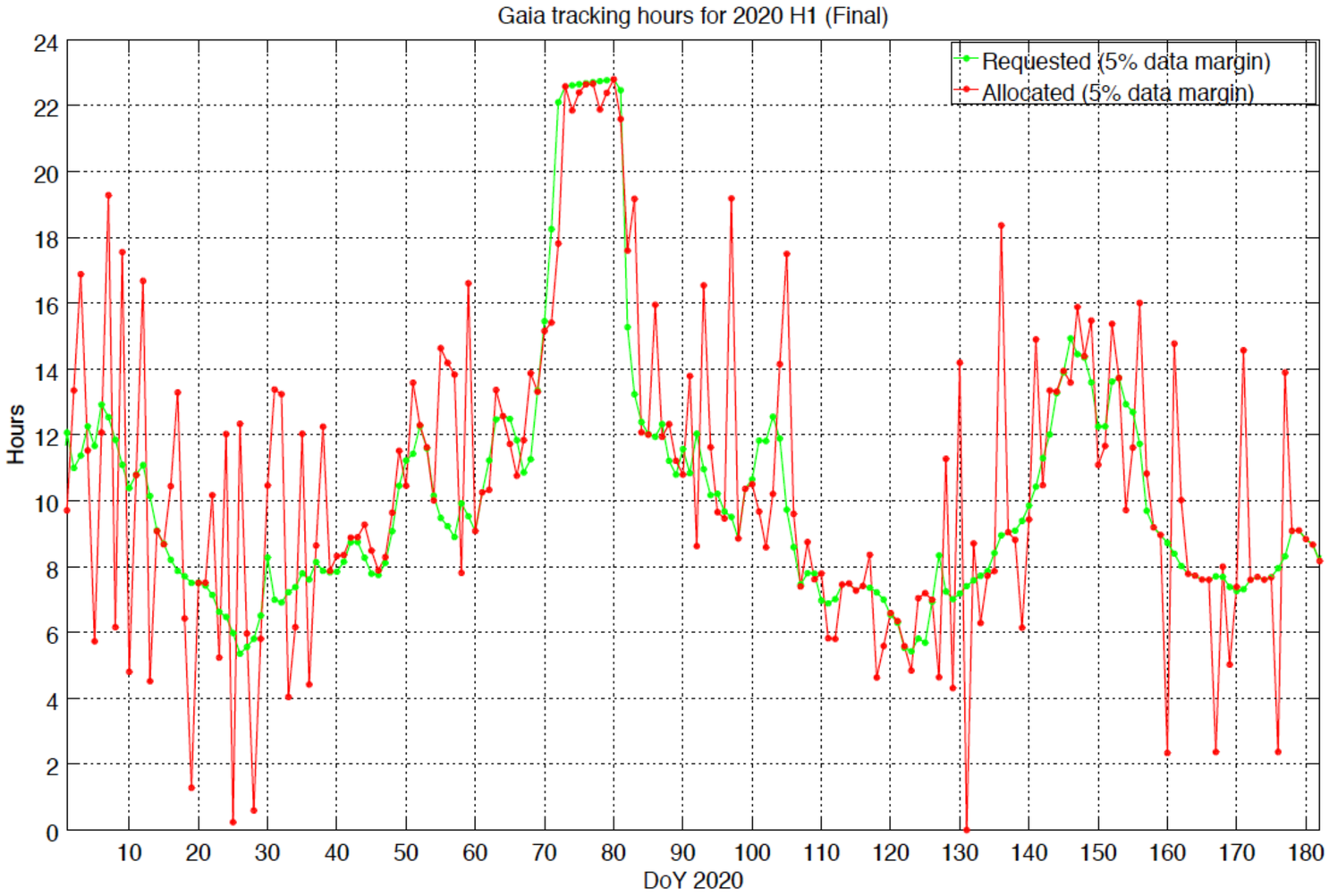
- Micrometeoroid hits and tank bubbles cause attitude disturbances at expected rates
- Repeating anomalies are recovered with automated on-board procedures

CURRENT DATE AND TIME	2019-12-17T11:41:29 (TCB)
MISSION STATUS	
Satellite distance from Earth (in km)	1,539,152
Number of days having passed since 25 July 2014	1971
Number of days in mission extension	154
OPERATIONS DATA (collected since 2014/07/25)	
Volume of science data collected (in GB)	74,212
Number of object transits through the focal plane	141,022,176,018
Number of astrometric CCD measurements	1,390,075,735,030
Number of photometric CCD measurements	280,878,205,328
Number of spectroscopic CCD measurements	27,389,317,443
Number of object transits through the RVS instrument	9,165,820,508

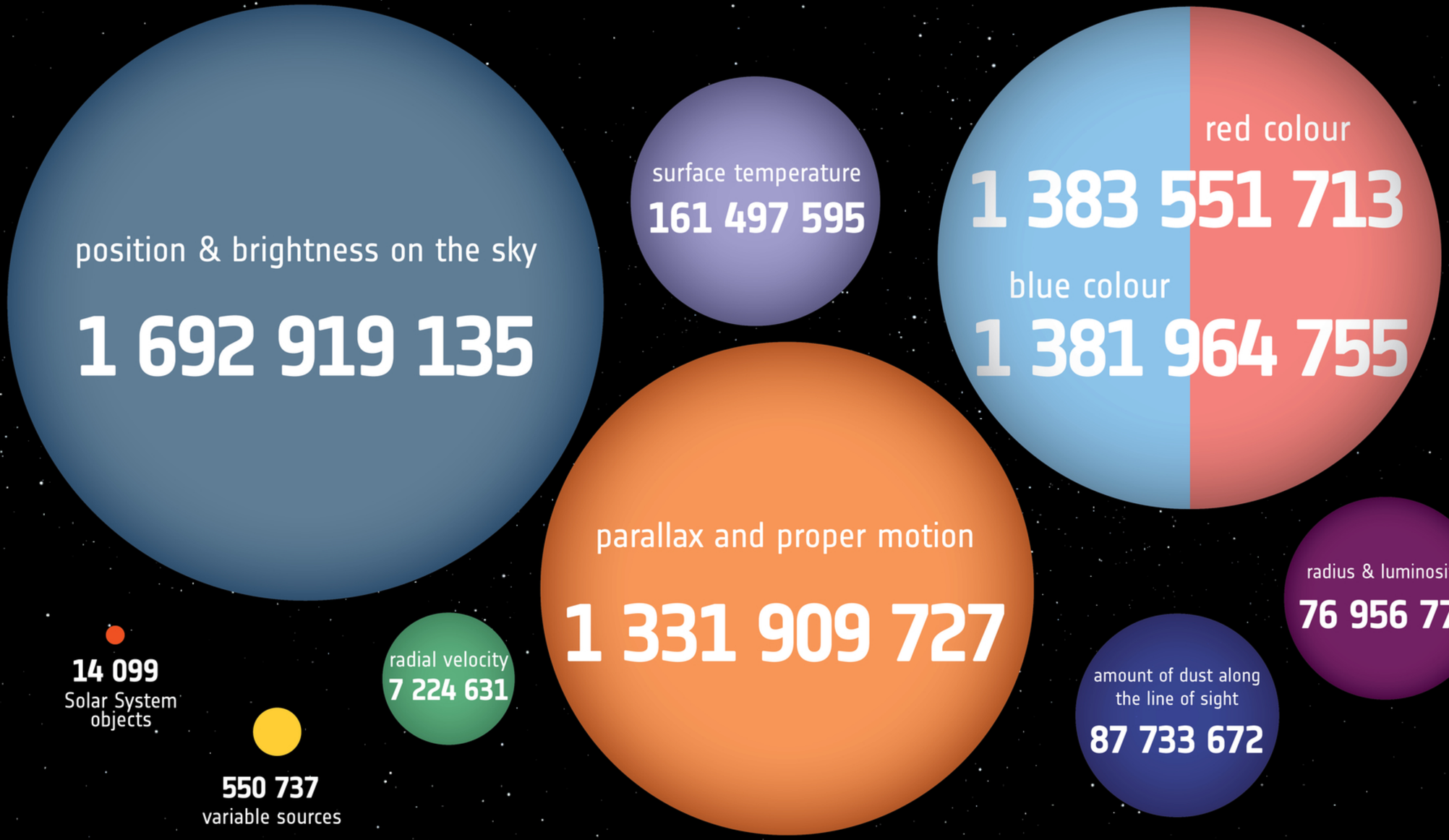
Eclipse avoidance manoeuvre marked the end of nominal 5 year mission in summer 2019

Data acquisition

Gaia is the main user of ESA deep space network



Gaia DR2 in numbers

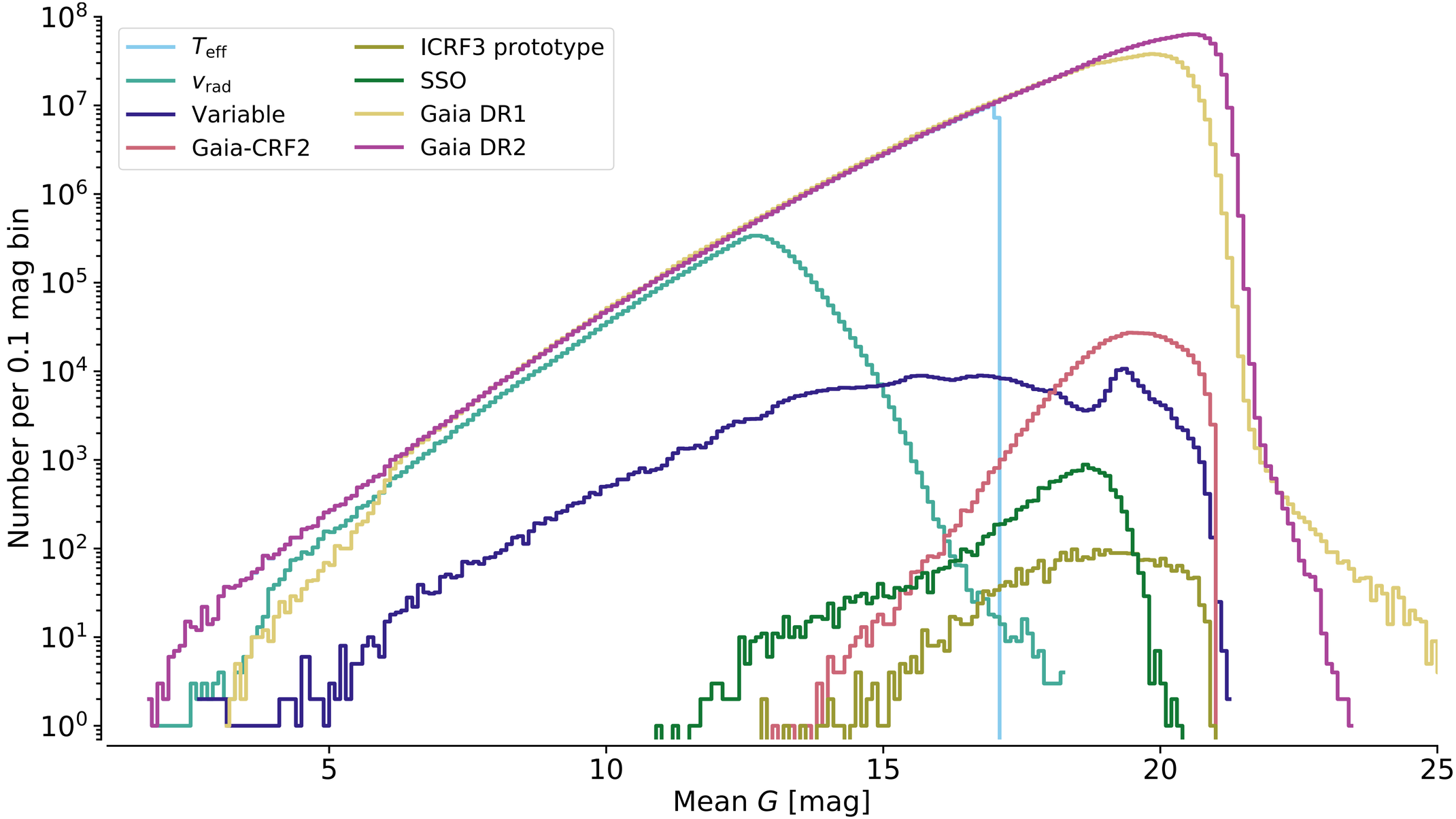


www.esa.int

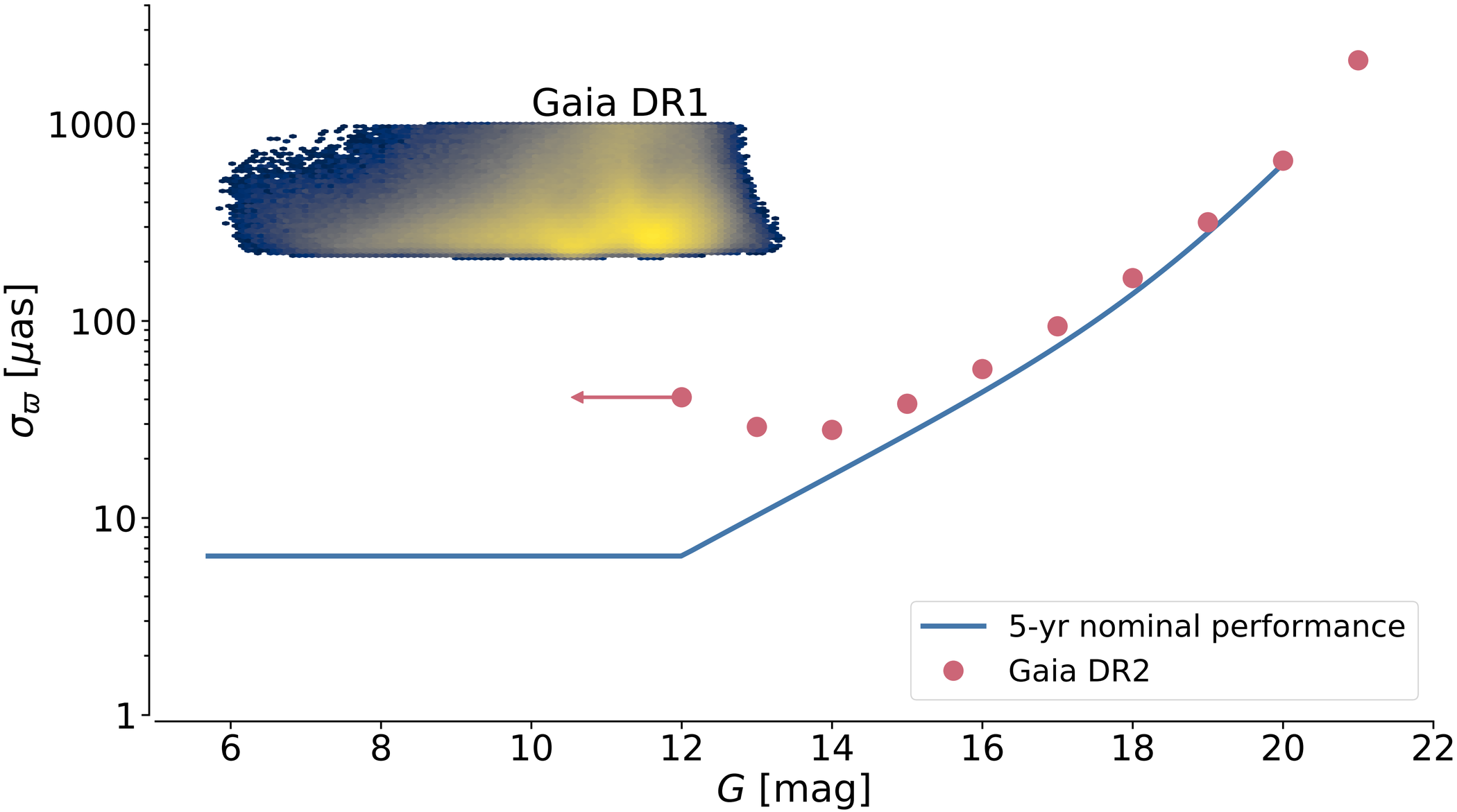
The second data release of ESA's Gaia mission is scheduled for publication on 25 April 2018.

European Space Agency

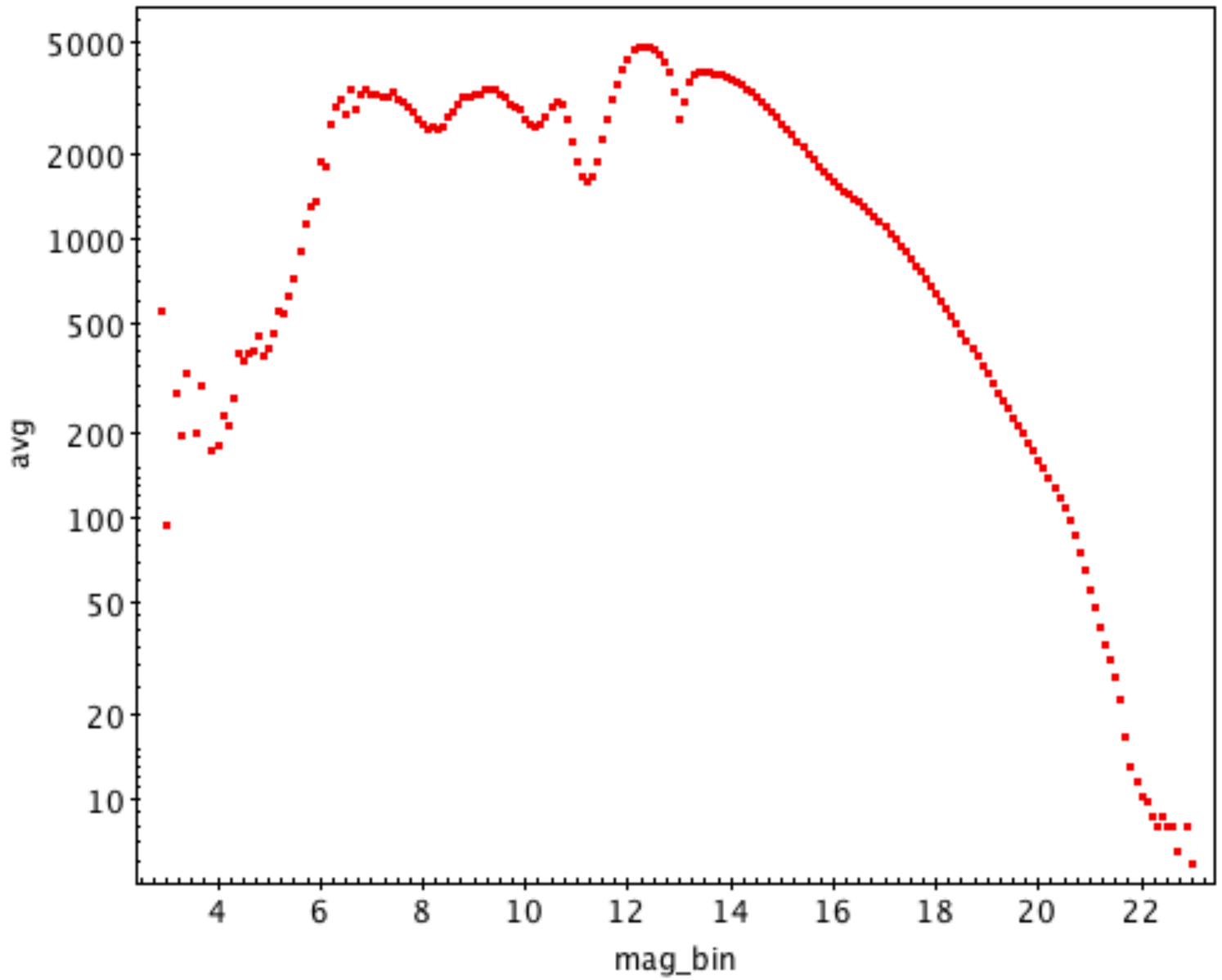
Gaia DR2


T_{eff}
v_{rad}
Variable
Gaia-CRF2
ICRF3 prototype
SSO
Gaia DR1
Gaia DR2
Number per 0.1 mag bin
10^0
10^1
10^2
10^3
10^4
10^5
10^6
10^7
10^8
5
10
15
20
25
Mean G [mag]

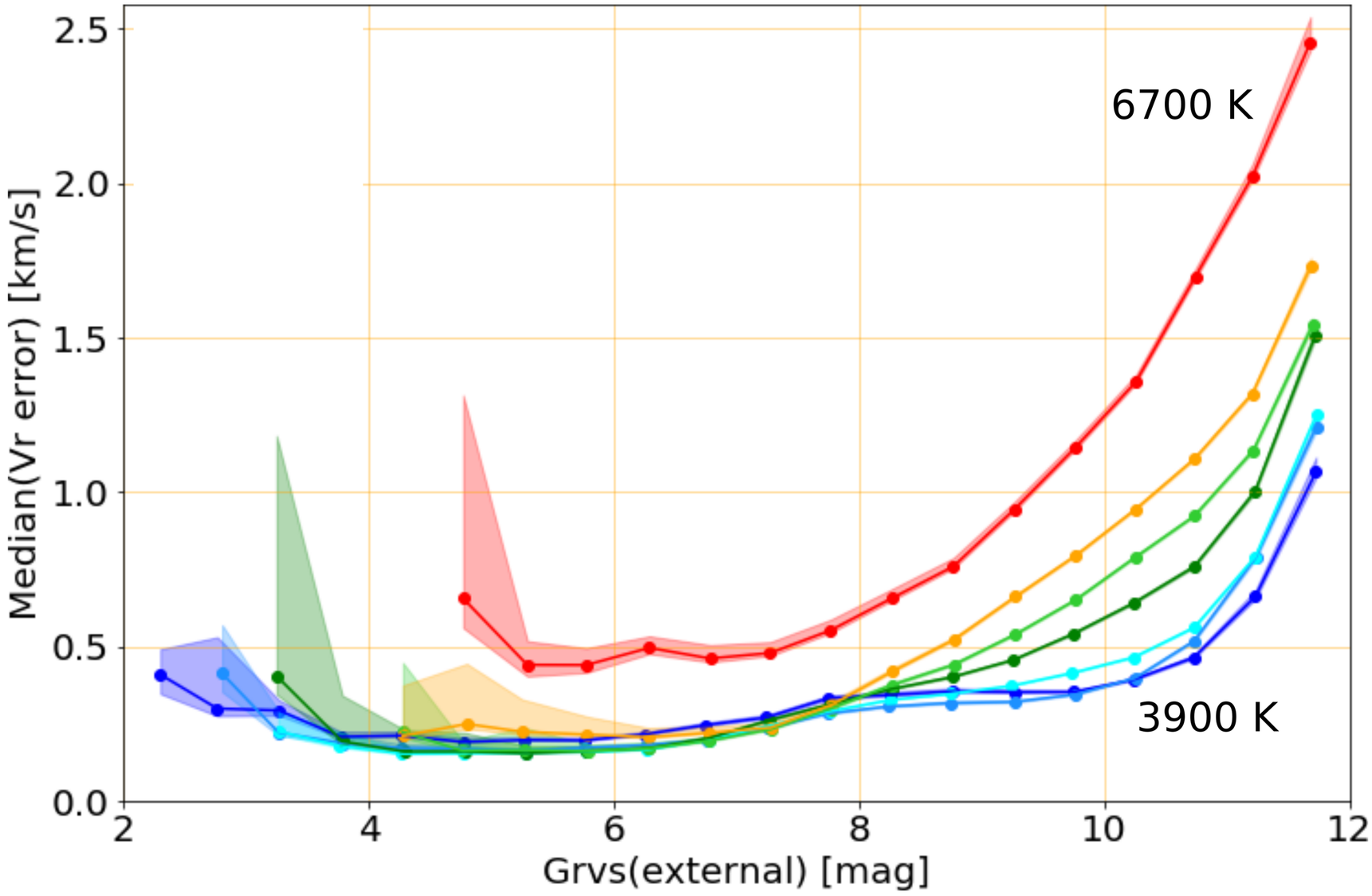
Astrometric performance: parallax



Photometric performance: average S/N



Radial Velocity: precision



Gaia DR2 science highlights

More than 1000 refereed papers

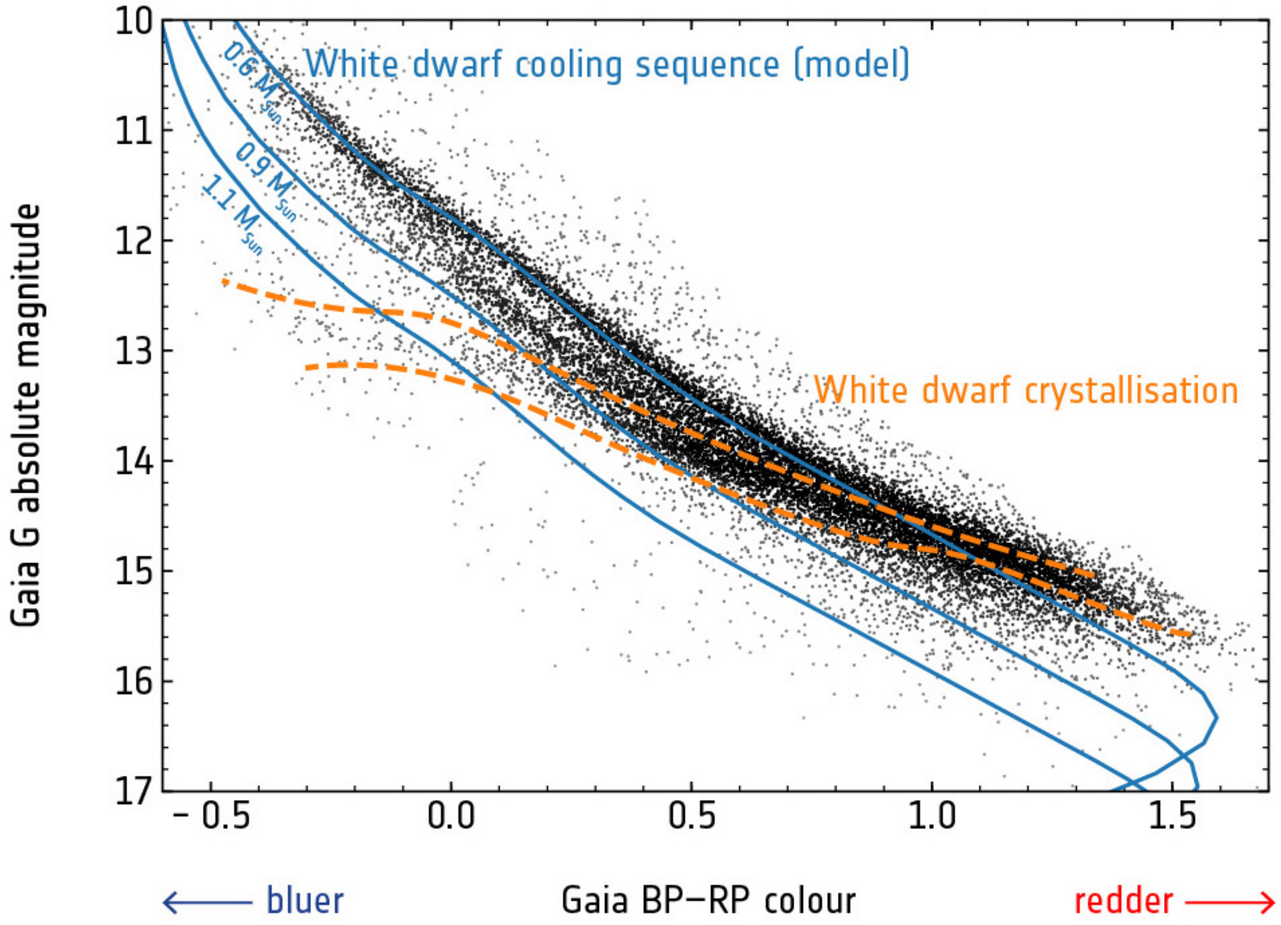
More than 300 arXiv preprints on the road …

9 Nature articles (3 in main Nature journal relying fully on Gaia DR2 data)

Helmi et al. 2018

Antoja et al. 2018

White Dwarfs



Tremblay et al. 2019

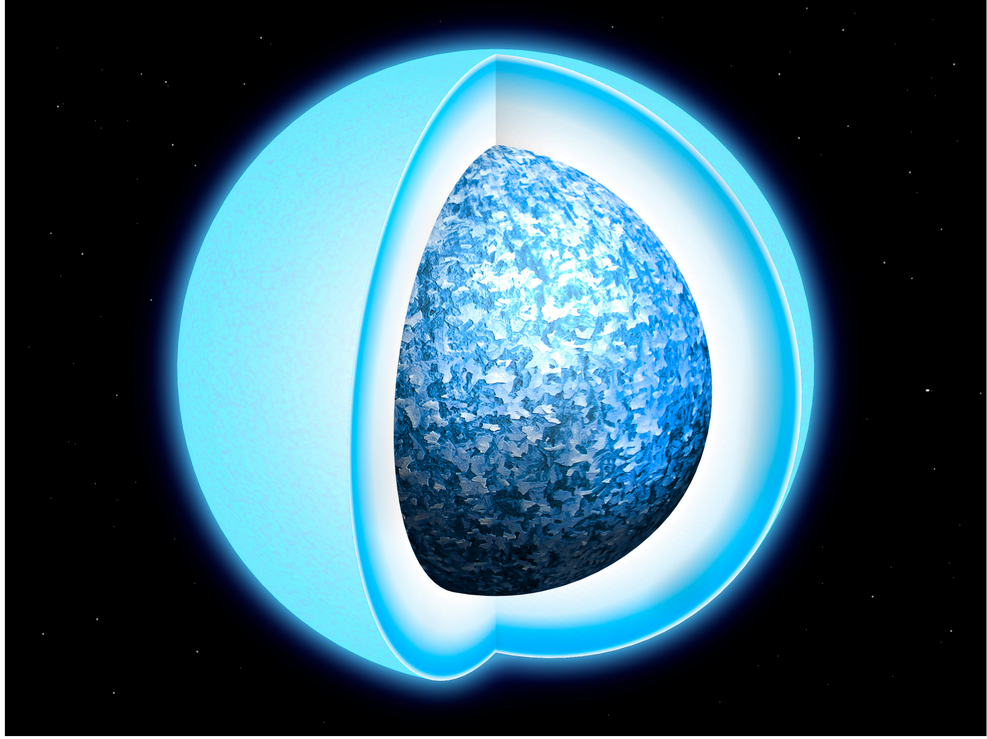
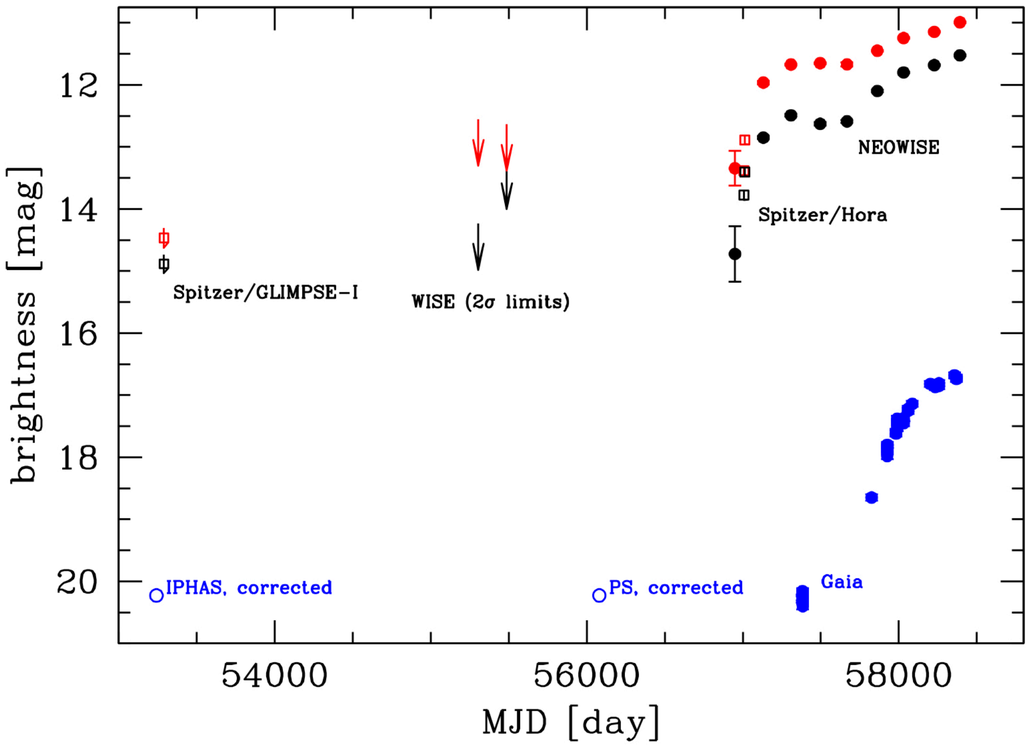


Image Credit: Mark Garlick; University of Warwick; European Research Council

FU Ori outburst



Hillenbrand et al. 2018

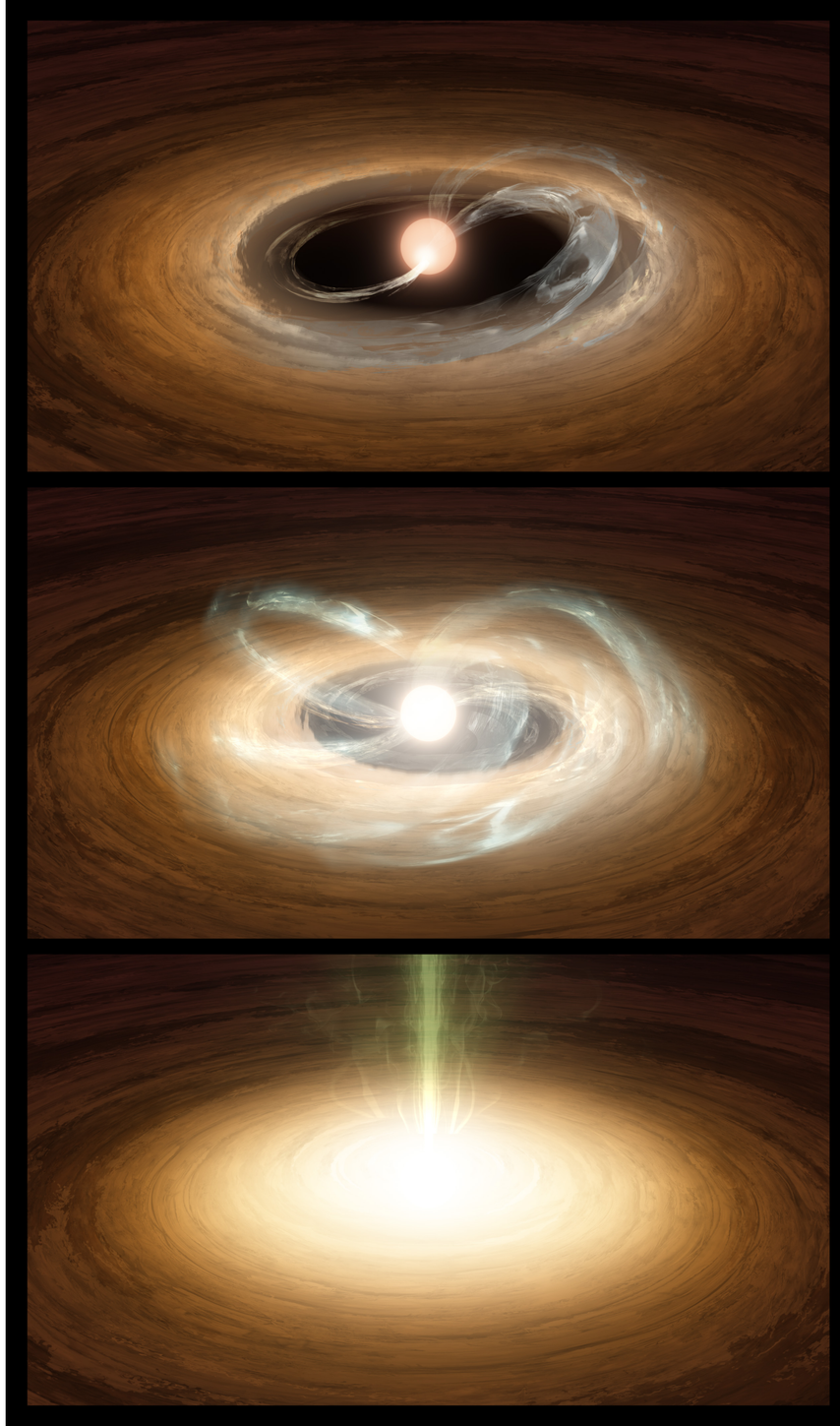
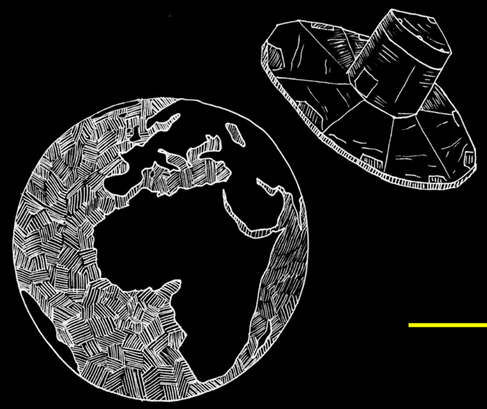
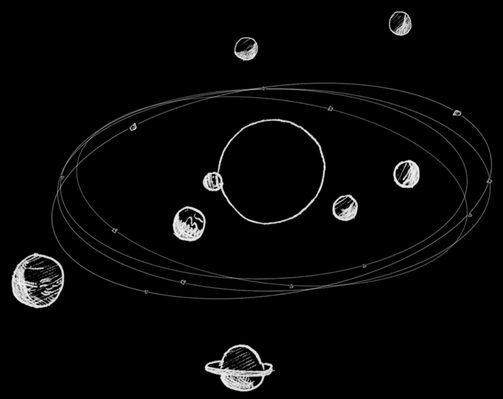


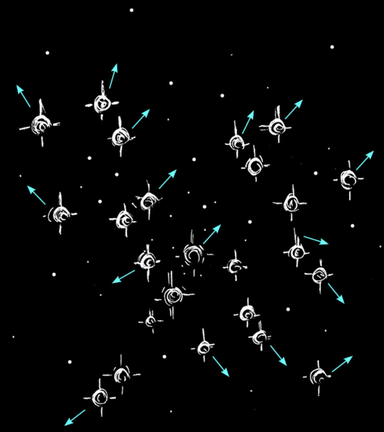
Image credit: Caltech/T Pyle (IPAC)



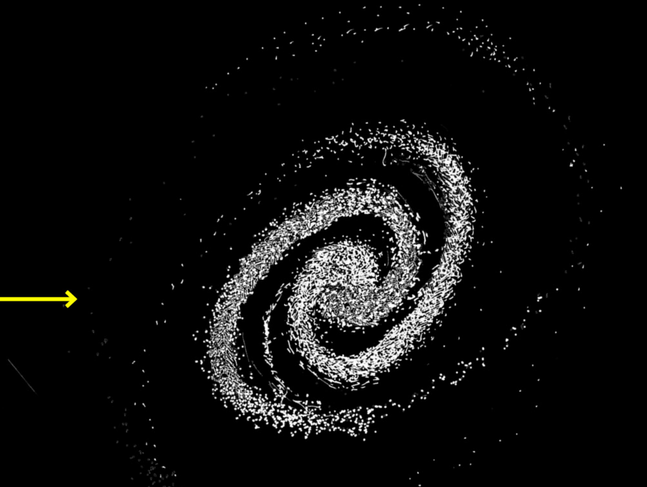
Earth & Gaia



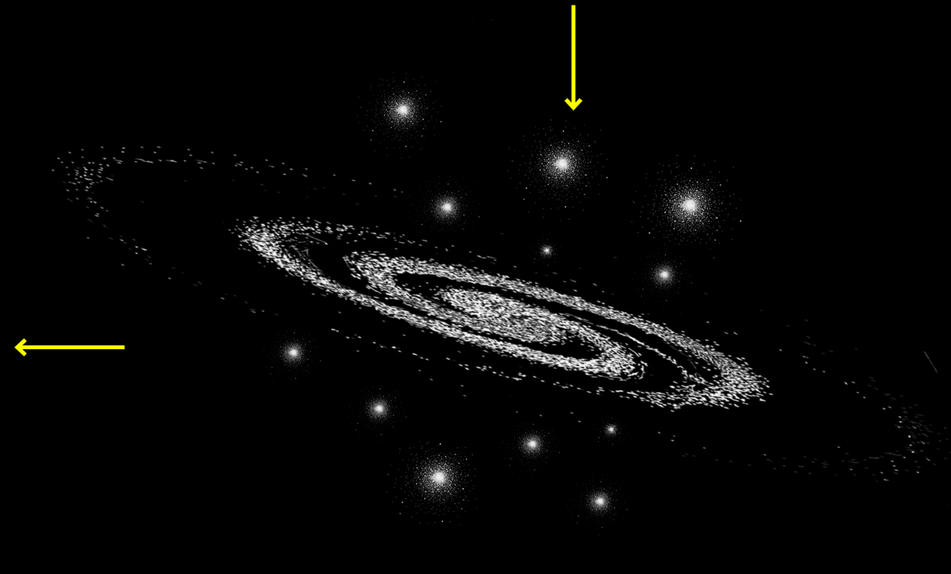
Solar System objects



Stars near the Sun

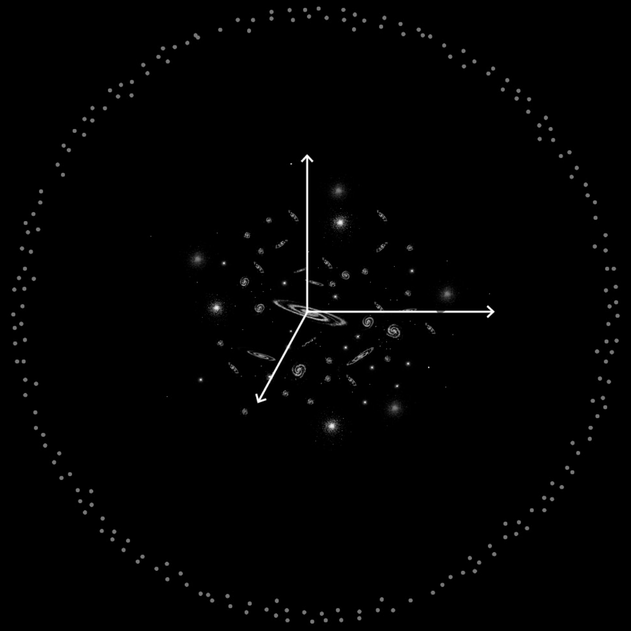


Milky Way: disc and bulge



Milky Way: halo and globular clusters

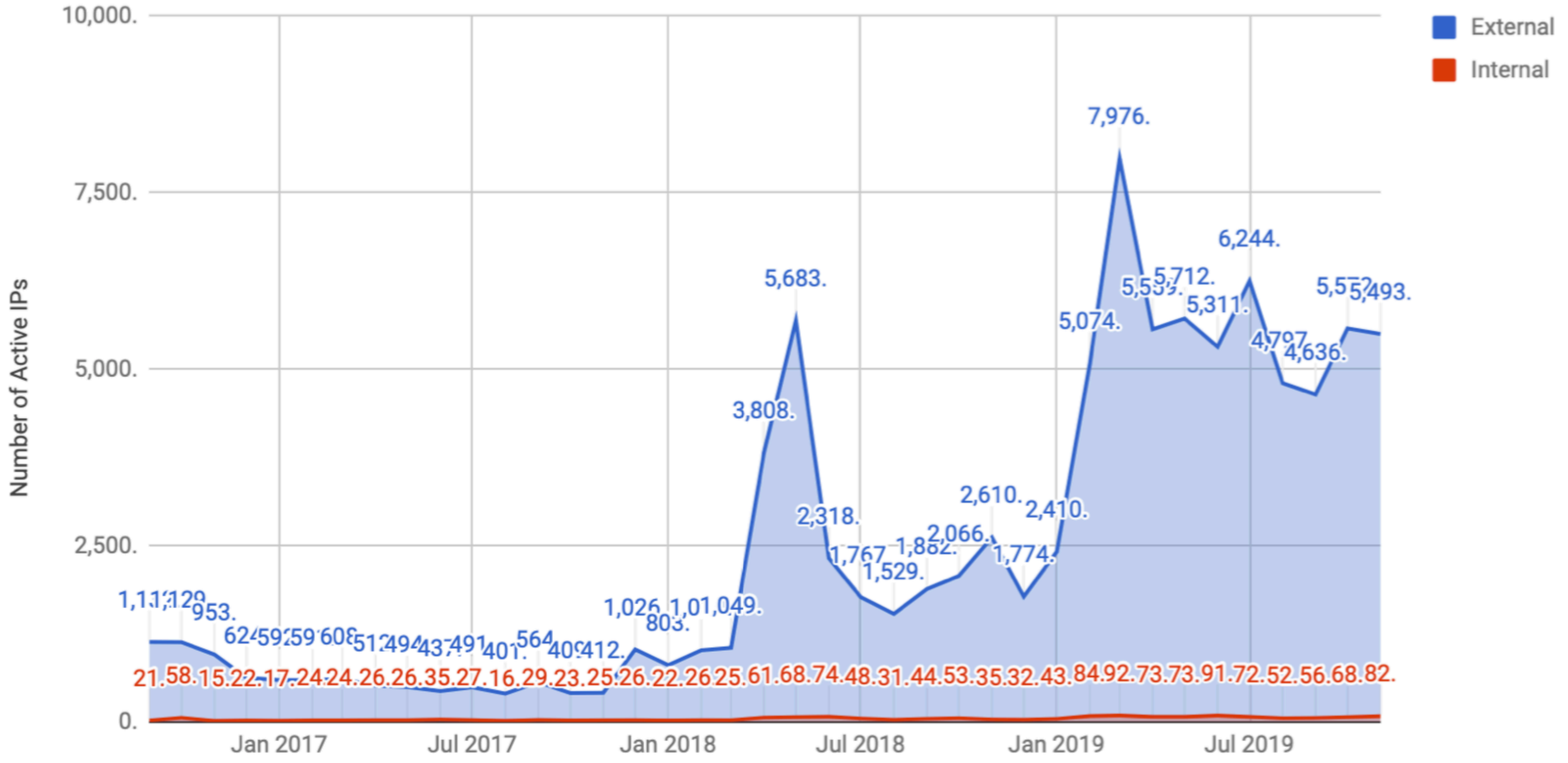
Nearby galaxies



Celestial reference frame: distant quasars

Use of Gaia DR2 data

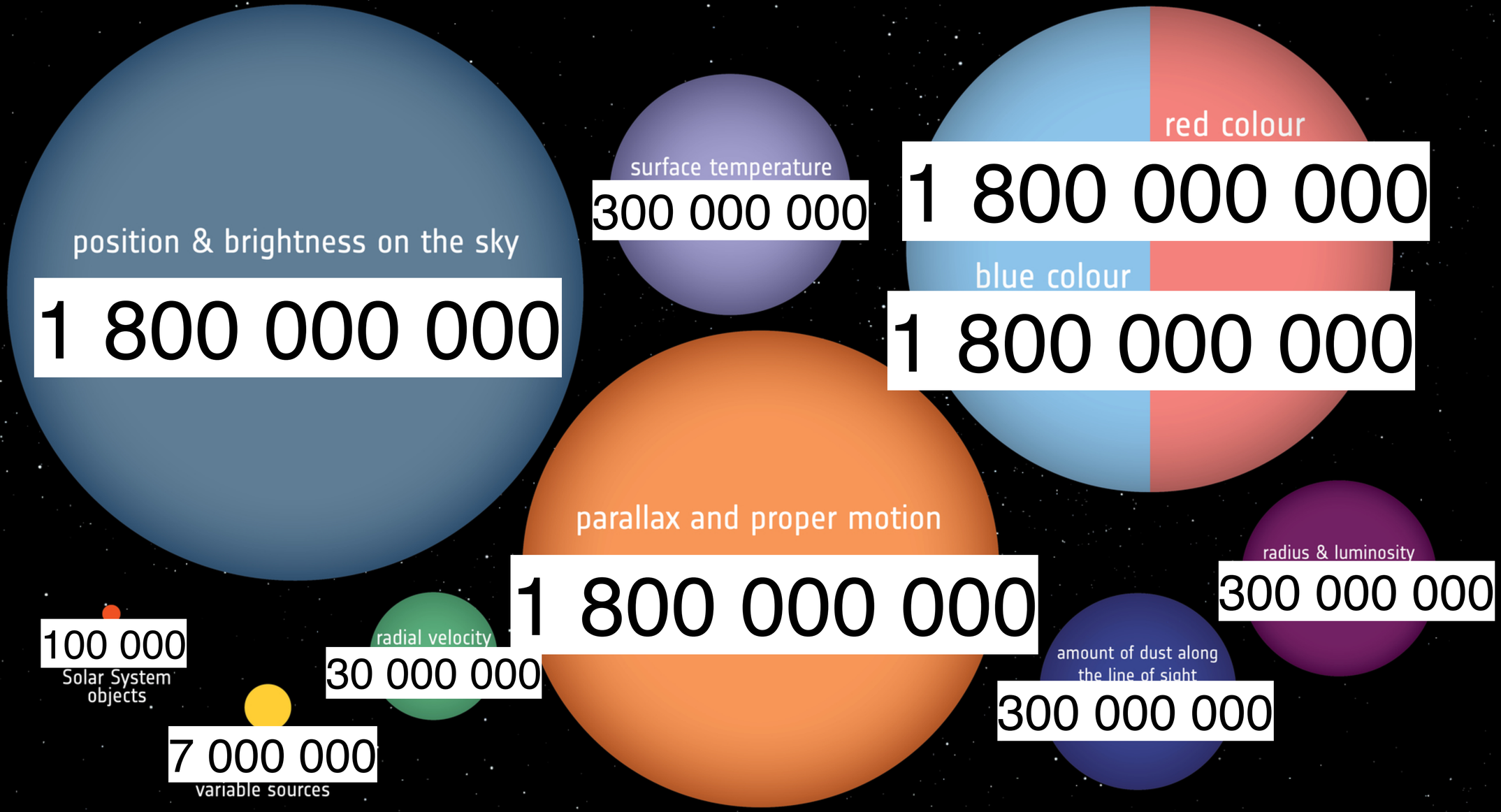
Use of archive going up



Gaia DR3: 34 months of mission data

- Split into early and full Gaia DR3
  - Instead of waiting for everything to be ready, release ready data early
- Gaia EDR3 third quarter (Q3) 2020
  - Astrometry and (integrated) photometry
- Gaia DR3 second half (H2) 2021
  - Gaia EDR3 (no update)
  - Radial velocities (more due to fainter limit)
  - Variable objects (more due to longer time baseline)
  - Astrophysical parameters (based on spectra which are also to be released)
  - Solar system objects (significantly more)
  - Non-single stars (first multiple star release)
  - Results from (pre-selected list of) quasars and extended objects

Gaia DR3 in numbers



The second data release of ESA's Gaia mission is scheduled for publication on 25 April 2018.

Gaia extension

Gaia extension funding handled in the standard 2+2 years ESA science mission extension cycle

- Extension for mid-2019-2020 approved
- Extension for 2021-2022 indicatively approved
- Planning: June 2020 approval for 2021-2022 extension and indicative approval for 2023-2024 etc.
- End-of-mission: end 2024±6 months due to exhaustion of cold gas for attitude control

Conclusions

Gaia operations nominal

Eclipse avoidance manoeuvre on 16 July successfully executed

Gaia extension approvals as planned

Gaia data used and published