

Plenary Talk

THE FIRST GAIA DATA RELEASE

C.A.L. Bailer-Jones

Max Planck Institute for Astronomy, Heidelberg

The first Gaia data release is on 14 September 2016, 1000 days after the launch of the Gaia spacecraft. This preliminary release comprises three parts. The first part is the G-band photometry and positions of more than one billion sources over the whole sky down to $G=20.7$, with a typical positional precision of 10mas. The baseline of Gaia observations used in this release is formally too short to solve for all five astrometric parameters (two positions, parallax, and two proper motions). However, the use of Tycho-2 positions with an epoch of around 1991 has enabled a more complete astrometric solution for the Tycho-2 stars observed by Gaia. This provides the second part of the release: the positions, parallaxes, and proper motions of around two million stars down to $G=12$, with estimated parallax and proper motion accuracies of 0.3mas and 0.3mas/yr respectively. This is about three times more accurate than Hipparcos for twenty times as many stars. The third part of the release is high cadence light curves of a few thousand variable stars obtained in a special observing mode.

In this talk I will outline the properties of the first release and the limitations of the processing which went into this. In particular, the above accuracies are systematic errors: averaging quantities over multiple stars will not improve the accuracy of the mean beyond the quoted levels. The second data release, planned for the end of 2017, will be based on a longer observing baseline and more observations. This will deliver five-parameter solutions for around one billion sources using Gaia data only, and will achieve much higher accuracies than is possible in this first release.