A Gaia DR2 view of the open cluster population in the Milky Way.

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Abstract

As simple stellar populations, made of a dozen to several thousand stars of the same age and chemical composition, open clusters are basic constituents of our Galactic disk. Their ages, ranging from a few million to several billion years, can be estimated relatively easily. Their distances can also be estimated more precisely than for individual stars. We take advantage of the exquisite astrometry of the second Gaia data release (Gaia DR2, Gaia collaboration et al. 2018) to establish a list of members in all clusters listed in the literature.

We queried the Gaia DR2 data in the field of view of over 3000 open clusters and candidates listed in the catalogues of Dias et al. (2002) and Kharchenko et al. (2013). We applied the unsupervised classification approach of UPMASK (Krone-Martins & Moitinho, 2014) to the Gaia positions, proper motions and parallaxes.

We derived a secure membership list for over 1200 open clusters. We also discovered 60 previously unreported objects. The distances we derive allow us to draw a portrait of the Milky Way disk out to distances of ∼4 kpc. The youngest clusters in our sample clearly trace the spiral structure of the disk. We observe that in the outer disk, clusters older than log t∼8.5 stray away from the Galactic plane, while old clusters appear to be non-existent in the inner disk. The precision of the Gaia astrometry shows that a significant fraction of the clusters listed in the literature are coincidental asterisms. (See poster).