

A 5D map of the nearest open clusters from high-mass stars down to the substellar regime

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Abstrakt:

We present a 5D map of four of the nearest clusters to the Sun: Alpha Persei ($d \sim 178$ pc, 85 Myr), the Pleiades ($d \sim 135$ pc; 125 Myr), the Hyades ($d \sim 46$ pc; 650 Myr; Lodieu et al. 2019), and Praesepe ($d \sim 187$ pc; 590 Myr). We identified bona-fide kinematic members from high-mass stars down to the hydrogen-burning limit and below (depending on the distance and age of the cluster) in the second data release of Gaia. We revised the physical sizes of the clusters, and inferred updated mean distances and velocities. We derive the luminosity and mass functions and compare them to the log-normal form of the Chabrier field mass function. We also looked at the 3D spatial distribution of members and produced movies of the new members in 3D space. We find that high-mass stars tend to be located in the central regions of the clusters while low-mass stars are more frequent beyond the half-mass radii. We clearly confirm the presence of a stream in the Hyades and the Pleiades. We also compare the age of these clusters, from the literature, with the ages that we obtain from a few white dwarfs belonging to the clusters (Lodieu et al. 2019a,b)