Contribution ID: **146** Contribution code: **P19** Type: **Poster**

Structure of Open Clusters

Monday, 19 August 2024 17:08 (2 minutes)

We investigated the available Gaia catalogue data (DR3) of open clusters and studied cluster distances, sizes and membership distributions in the 3D space. The dependence of distance and size on the parallax-to-distance transformation was analysed. We argue that within two kpcs, the inverse-parallax method gives results comparable to the Bayesian approach based on the exponentially decreasing volume density. Both methods show similar dependence on the line-of-sight elongation of clusters. We also looked at a measure of elongations of the studied clusters and found that the most distant cluster contains about half of its members within a spherical fit located at about 1000 pc. These results show that the 3D structure of an open cluster cannot be studied appropriately beyond about 500 pc when using standard transformations of parallaxes to distances. Equally significant is our exploration of tidal tails. A star cluster elongates with time along its path and begins to lose members, primarily low-mass stars, forming two tidal tails along the cluster orbit. Our N-body simulations have revealed that for circular orbits, the length of the overdensities along the tidal tail from the cluster centre is solely dependent on the mass of the cluster and the strength of the tidal field. This length decreases monotonically with time. In the more general case of eccentric orbits, the orbital motion influences the length, leading to periodic compression and stretching of the tails, resulting in an oscillation with time. In the clusters'vicinity, tails are characterized as co-moving stars motion of the corresponding cluster. Simulations confirm that the tidal tails closely follow the orbit, showing only small drifts in the most remote parts of the tidal tails. Our presentation will shed light on our current understanding of the tidal tails of star clusters in our Milky Way, a significant contribution to the field.

Affliation

Masaryk University

Current Position

PhD Student

Primary author: RAMEZANI, Tahereh (PhD Student of Masaryk University)

Co-authors: PAUNZEN, Ernst; RAMEZANI, Tahereh (Masaryk University)

Presenter: RAMEZANI, Tahereh (PhD Student of Masaryk University)

Session Classification: Flash Poster Presentations (in-person)