

Visualization of the Early Evolution of a Star Cluster in the Galactic Tidal Field

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This animation shows the dynamical evolution of a star cluster as it evolves toward an equilibrium configuration. The cluster is initially 'cold' (the initial stellar velocities are not large enough to support the stellar system against its own self-gravity) and collapses. As it collapses, the cluster is also moving on its orbit around the Galactic center. The presence of the external tidal field along with the Coriolis effect due to its orbital motion in the Galaxy significantly affects the collapse process and the resulting structural and kinematic properties. In particular, the animation presented shows a deeper collapse along the vertical direction (z-axis; perpendicular to the orbital plane) leading to a final system characterized by a significant flattening. As a result of the Coriolis effect, stars acquire a significant rotation around the z-axis. During the phases of collapse and rebound shown in the animation, different parts of the system acquire rotation in opposite directions; the final system is characterized by a dense central core with counter-clockwise rotation and a low-density outer halo with clockwise rotation.

Link to video

<https://iu.app.box.com/s/g34epsc0l2751e8mzu48>

Preview is low-resolution. Please download the file for full resolution.