

Orbit Analysis of a Self-consistent N-body Model of Milky Way-like Barred Galaxy

Yujing Qin (Shanghai Astron. Obs.) and Juntai Shen (Shanghai Astron. Obs.)

We analyze the orbital structure in the N-body model of Milky Way-like barred galaxy of J. Shen *et al.* (2010), and evaluated the contributions of different orbital families to its edge/face-on light profile. Stellar orbits are integrated in a 'frozen potential' extracted from the last snapshot, with final positions and velocities of particles used as their initial conditions. We calculate their frequencies in each direction with Fourier transformation, and test their chaotic behavior using various indicators, including the Smallest Alignment Index (SALI) and Specific Finite-time Lyapunov Characteristic Number (SFTLCN). Orbits are classified into few major families according to their degrees of chaos and states of resonance, and their spatial distributions are in consistent with previous theoretical work on the orbital families in the bar structure. We demonstrate that the analysis of stellar orbits with frozen potential method preserves the overall orbital structure, thus can be used for detailed studies of N-body simulations.