Global Dynamics in a self–consitent model of Elliptical Galaxy

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Abstract

In the present paper we study the global dynamics corresponding to a realistic model of self–consistent triaxial galactic system. We extend the previous work of Muzzio et al. ([2005]) where the authors investigate about 2,700 orbits in this model at different energy levels using orbital clasification and Lyapunov exponents to measure caoticity. Here we first display the main properties of the potential and then we focus our attention on the global dynamical properties of the box domain for nine energy surfaces. Using the MEGNO (Cincotta & Simó [2000], Cincotta et al. [2003]) as a fast dynamical indicator, we gain insight in the resonance structure at different energy levels, the way in which realtively large chaotic domains appear due to overlapping as well as crossings of resonances and measure the fraction of chaotic motion onto the energy space. It is interesting to notice that the triaxiality of the system varies over a rather wide range, namely from 0.95 to 0.45, and the fraction of chaotic motion ranges from ~ 0.3 at small energies up to ~ 0.8 at moderate values of the energy, decreasing then again down to values close to ~ 0.4 for which the system becomes nearly spherical.

References

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