Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Orbits in a two Dimensional Non-axis-symmetric Galactic Potential[1] NELSON ZAMORANO, ALFREDO GÓMEZ, Depto. de Física, F.C.F.M. Universidad de Chile , ANDRES MEZA, Depto de Física, Universidad Andres Bello — The dynamics of stellar objects, considered as point test particles in a non-axis-symetric logarithmic galactic potential $U(x,y) \propto \ln[Rc^2+x^2+(y/b)^2]$ are studied, using a Leapfrog Integrator. This potential has been used in astrophysics for its versatility to mimic the main features of the galactic dynamics. This model, with $b = 1$, reproduces the constant orbital velocity observed at the outskirts of spiral galaxies. In this example, the logarithmic potential appears to include the gravitational effects of both the visible and the dark matter lying in the galaxy. The ellipticity parameter $0 < b < 1$ generates a fluctuating torque that operates on the moving test particles of the galaxy and triggers the emergence of a non conventional set of families of orbits. It marks the difference between the usual inverse power law potentials considered in the textbooks and the logarithmic potential. We study these orbits, provide a physical analysis of their main properties and provide a simple numerical approach that reproduces most of the orbits associated with this potential, contains a study of the different families of orbits that belong to this potential and gives detailed study about the behavior of the torque and angular momentum as a functions of time and the angle associated.

[1]www.logpot.diinoweb.com/files/

Alfredo Gómez
Depto. de Física, F.C.F.M. Universidad de Chile

Date submitted: 12 Jan 2009 Electronic form version 1.4