An introduction to Galactic Refraction Billiards

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A new type of dynamical model, describing the motion of a point-mass particle in an elliptic galaxy with a massive central core (such as, for example, a Black Hole), is studied.
This kind of model belongs to the more general class of the refraction billiards, which are particularly useful as a way to describe the dynamics of particles under the action of discontinuous potentials. In our case, a refraction interface (a regular closed curve) separates a Keplerian potential with positive energy from a two-dimensional homogeneous harmonic potential.
The dynamical properties of the system depend crucially on the geometric features of the interface. In particular, this talk aims to present the model and the main results on its dynamics, regarding the stability of the fixed points and bifurcation phenomena, as well as the arising of chaotic behaviours.

Work in collaboration with V. Barutello and S. Terracini.

References

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