Main Speakers: List of Abstracts

Leonid Bunimovich (Georgia Institute of Technology)

Title: Billiards: basic properties, mechanisms of chaos and astigmatism. **Abstract:** I will present the basic properties of the billiard-type dynamical systems. The following topics will be discussed:

- Basic properties of billiards
- Integrable billiards
- Mechanisms of chaos: dispersing and defocusing
- Billiards with mixed behaviour (divided phase space)
- High-dimensional billiards and astigmatism

Péter Bálint (Institute of Mathematics, Budapest University of Technology and Economics)

Title: Ergodic and statistical behaviour in hyperbolic billiards.

Abstract: One of the main reasons for the popularity of hyperbolic billiards is that they provide transparent and physically realistic models for a wide range of chaotic phenomena. A mathematically rigorous treatment of these systems is, however, technically rather challenging. Recent developments have opened up new perspectives in the field, in particular concerning bounds on the decay of correlations and statistical limit laws. In my talks I would like to describe the ergodic properties of some major classes of chaotic billiards, and to discuss briefly certain technical aspects, along with the possibilities for further applications.

Martin Sieber (University of Bristol)

Title: Quantum billiards.

Abstract: This talk will discuss the use of billiards for modeling quantum systems. As in the classical case the main advantage of billiards is that they are relatively simple, but still can exhibit the whole range of behaviour from integrability to quantum chaos. Topics of my talk will include: properties of eigenvalues and eigenfunctions of the Helmholtz equation, boundary integral methods, semiclassical approximations and trace formulas, influence of bifurcating orbits and diffraction.

Carl Dettmann (University of Bristol)

Title: Open billiards and applications.

Abstract: This talk will involve billiards in which the particle can escape through a hole, concentrating mostly on the classical case. There have been recent advances in the understanding of open dynamical systems in both integrable and chaotic cases, with billiards providing both examples and particular specific features. I will give a brief overview of the range of techniques applicable to these problems and of applications involving escape of light, sound, atoms or electrons.