Scuola Matematica Interuniversitaria
Course on ``Dynamics of Billiards''

Il Palazzone, Cortona, June 29-July 4 2025

In the week June 29-July 4 2025, the Scuola Matematica Interuniversitaria offers a summer course in Cortona in the castle named "Palazzone", owned by the Scuola Normale Superiore. Usually, at these courses 12 applicants are offered free lodging, breakfast and lunch at Palazzone. The typical audience consists of Ph.D. students writing their thesis and post-docs. Applications are scheduled to be accepted starting approximately at March 15, 2025: applicants can find more details at

https://www.smi-math.unipr.it/cortona/30/

There will be two lecturers, who will cover the following programs:

Krzysztof Burdzy (University of Washington):
Borderline billiards theory (such as billiards with no borders)

The lecturer will discuss several models, including Archimedes' principle for an ideal gas, pinned billiard balls, rotating billiard tables, and billiard balls in a space without walls. Some techniques that are related to or arose in these areas will be presented.

Marco Lenci (Universita' di Bologna)
An introduction to the theory of chaotic billiards

The course will give an introduction to the theory of hyperbolic billiards, developed by Sinai and his school some 50 years ago. This theory — somehow sought after since the times of Boltzmann, Poincaré and Birkhoff — has had a profound impact on the development of the theory of chaotic dynamical systems and its applications, and earned Yakov Sinai his 2014 Abel Prize. The audience will get acquainted with the basic tools of hyperbolic dynamics in the presence of singularities and will see a fairly detailed sketch of the proof of the ergodicity of the Sinai billiard, a.k.a. Lorentz gas. A minimal background in measure theory is required; some rudiments of ergodic theory are welcome.