Berlin Mathematical School

BMS Kovalevskaya Colloquium

Friday 29 April 2016 at 14:15
Tea & Cookies starting at 13:00

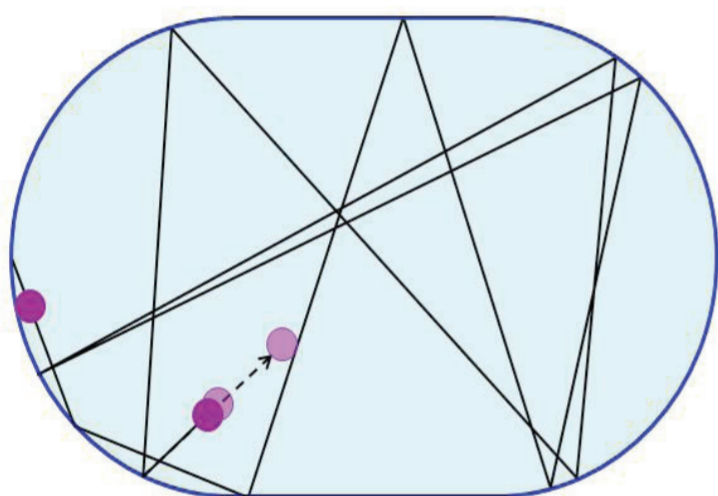BMS Loft, Urania, An der Urania 17, 10787 Berlin

Shiri Artstein
(U Tel Aviv)

inspired by https://en.wikipedia.org/wiki/File:BunimovichStadium.svg

Billiards in convex domains

Mathematical billiards were described by A. B. Katok as "the mathematician's playground", as they are easily describable models which portray a broad variety of dynamical behaviors from complete integrability to chaotic motion. Furthermore, the study of billiard dynamics has vast applications to different fields, such as mathematical physics, number theory, acoustics, optics and more.

In her talk, Artstein shall discuss billiard dynamics in convex domains. After giving some background information, she will describe how a certain symplectic invariant on the classical phase space can be used to obtain bounds and inequalities on the length of the shortest periodic billiard trajectory, both in Euclidean and in the more general Minkowski billiards. Artstein shall explain connections with other questions in geometry, in particular, she will show how a symplectic isoperimetric conjecture by Viterbo is related to a 70-year-old open conjecture by Mahler with regards to the volume product of convex sets. The connection uses some new results on billiard dynamics, which she will also explain.

Shiri Artstein is a professor of mathematics at Tel Aviv University. Her fields of interest include asymptotic convex geometry and its links with symplectic geometry, among others. Artstein completed her PhD at Tel Aviv University in 2004. She then spent two years at Princeton as a Veblen Research Instructor, before returning to Israel in 2006 to take up a position at Tel Aviv University. In 2008, she received the Krill Prize for Excellence in Scientific Research and, in 2015, she was awarded the Erdős Prize by the Israel Mathematical Union. Born in Jerusalem, Artstein lives with her husband and three children in Tel Aviv.

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