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HYPERBOLICITY OF MULTI-DIMENSIONAL SOFT BILLIARDS

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Summary: A soft billiard is a dynamical system where a point particle moves uniformly between scatterers, from which it is reflected. However, unlike in billiards, this reflection is not momentary, but governed by a spherically symmetric potential with a finite range (that is, the potential is only nonzero inside the scatterer, which is a sphere).

For several examples of soft billiards in two dimensions, strong statistical properties (hyperbolicity, ergodicity, and – lately – exponential decay of correlations) were proven. However, in higher dimensions, not a single example of a hyperbolic soft billiard is known. In this talk a proof of hyperbolicity is presented for some high-dimensional examples. The proof is based on a construction of invariant cones – also called sectors – by Wojtkowsky and Liverani ([1]).

References: [1] C. Liverani, M. Wojtkowsky: Ergodicity in Hamiltonian Systems. *Dynamics Reported* 4 (1995) 130–202.