1087-37-243 **Hongkun Zhang*** (hongkunz@gmail.com), Dept. of Math & Stat., University of Massachusetts, Amherst, MA 01003. *Random billiards with microstructure.*

We consider certain random billiard systems, i.e., billiards in which collisions with the wall of the table satisfy a random reflection law. The Markov operator is derived from a second billiard system that defines the model of surface structure at a "microscopic" scale. The main results we present, which are recent joint work with Renato Feres, relate the spectral theory of the Markov operator, geometric properties of the surface microstructure, and the diffusion constant of the random billiard motion in channels. (Received December 04, 2012)