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**Renato Feres\*** (feres@math.wustl.edu) and **Timothy Chumley**. *Entropy production in random billiards and the second law of thermodynamics*. Preliminary report.

A random dynamical system is said to be time-reversible if the statistical properties of orbits do not change after reversing the arrow of time. The degree of irreversibility is captured by the notion of entropy production rate. A general formula for entropy production will be presented that applies to a class of random billiard systems on Riemannian manifolds with boundary for which it is meaningful to talk about energy exchange between billiard particle and boundary. This formula establishes a relation between the purely mathematical concept of entropy production rate and the physical concept of thermodynamic entropy. In particular, it recovers Clausius formulation of the second law of thermodynamics: the system must evolve so as to transfer energy from hot to cold. This is joint work with Tim Chumley. (Received September 23, 2017)