



## PIMS / AMI Seminar

Friday, August 23, 2019

3:00 p.m.

SAB 331

### “Fourier’s law from microscopic deterministic dynamical systems”

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#### Abstract

Fourier’s law, or the law of heat conduction, is well-known for nearly two centuries, which states that the energy flux is proportional to the temperature gradient. However, the rigorous derivation of Fourier’s law from microscopic Hamiltonian dynamics remains a great challenge to theorists. In this talk, I will show the derivation of macroscopic thermodynamic laws, including Fourier’s law, from billiard-like deterministic dynamical system. A stochastic energy exchange model is numerically derived from a dynamical billiards heat conduction model that is not mathematically tractable. Then we take the mesoscopic limit of this energy exchange model by constructing two martingale problems. We find that Fourier’s law is satisfied by the steady state of the mesoscopic limit equation.