FOURIER'S LAW OF HEAT CONDUCTION FROM MICROSCOPIC PRINCIPLES.

DOMOKOS SZÁSZ

BUDAPEST UNIVERSITY OF TECHNOLOGY

ABSTRACT. In the first part of the 2008 strategy of Gaspard and Gilbert to derive Fourier's heat conduction law, one should establish - in the rare interaction limit - transition from the microscopic model to a mesoscopic one, i. e. from the full kinetic description of the billiard model to a Markov jump process. With A. Grigo and K. Khanin, we introduced a class of Markov jump processes also including those of Gaspard and Gilbert. Our conditions under which we could obtain a $\frac{C}{N^2}$ bound for the spectral gap, expectedly appropriate for establishing the hydrodynamic limit, have been weakened recently by Sasada. We could also characterize the reversible invariant measures. As to the first part of the program, we have a work in progress with P. Bálint, P. Nándori, T. Tasnády and IP. Tóth, whose goal is to substiantiate the Markov jump limit.