# THERMAL BOUNDARIES IN KINETIC AND HYDRODYNAMIC LIMITS

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We consider a chain of oscillators with one particle in contact with a thermostat at temperature T. The thermostat is modeled by a Langevin dynamics or a renewal of the velocity with a gaussian random variable with variance T. The dynamics of the oscillators is perturbed by a random exchange on velocities between nearest neighbor particles. Wigner distributions are the good tool to follow the space-time macroscopic evolution of the thermal energy.

The (thermal) energy has a macroscopic superdiffusive behavior governed by a fractional heat equation (i.e. with a fractional Laplacian). The microscopic thermostat imposes a particular boundary condition to the fractional Laplacian, corresponding to certain probabilities of transmission/reflection/absorption/creation for the corresponding superdiffusive Levy process.

This is from a series of works in collaboration with Tomasz Komorowski, Lenya Ryzhik and Herbert Spohn.