

Hyperbolic Hydrodynamic Limits with Boundaries

Stefano Olla¹, Stefano Marchesani²

¹ CEREMADE, Université Paris Dauphine PSL

² GSSI, L'Aquila

I will present a review of old and new results (and open problems) concerning hydrodynamic limits for a system of an-harmonic oscillators with external boundary tension in the hyperbolic space-time scale. The macroscopic equations are given by non-linear systems of hyperbolic conservation laws, like the compressible Euler system (3 conservation laws) or the p-system (2 conservation laws), with corresponding boundary conditions. The problem is particularly challenging when shockwaves are present and the limit profiles are L^2 -valued weak solution. Some results exist when the microscopic dynamics is perturbed by a conservative stochastic viscosity, modelling the contact with a heat bath. The new results concern the p-system in presence of shockwaves, where a stochastic version of the Tartar-Murat compensated compactness can be adapted to the presence of the boundary conditions. This requires also a proper definition of L^2 -valued weak entropy solutions with boundary conditions, that we call thermodynamic entropic solution, since they satisfy Clausius inequality.

References

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