140th MSS-Seminar
Wednesday, October 20th,
15:30 hrs, H3,
Egerlandstr. 3, Erlangen.

Lattice Boltzmann beyond Fluid Mechanics

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Lattice-Boltzmann methods (LBM) are usually saw as mesoscopic representations of a discrete fluid, where particle densities travel from cell to cell and collide on each other preserving mass, momentum and energy. But they can also be seen as a more general computational scheme: information travels from cell to cell and collide at each one driven by a Boltzmann transport equation, representing systems that evolve with other conservation laws. In this talk we will show how LBM can be used to represent Electrodynamics, Acoustics and Advection-Diffusion phenomena. In addition, we will show for the last two cases how to formulate them on generalized curvilinear grids (for instance, to simulate the acoustic waves inside the human cochlea or to increase resolution in some regions), so that the main advantage of LBM – that is, that each cell evolves without asking information to the neighboring cells – is almost preserved.