Introduction to the Boltzmann equation

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The Boltzmann equation is an integro-differential equations that gives a mesoscopic description of (monoatomic) gas dynamics. The particles are described through a density in the phase space of positions and velocities.

The equation can be (at least formally) derived from an N particle system in the limit $N \to \infty$. In the easiest model (hard sphere dynamics), the particles freely move along straight trajectories between elastic collisions with other particles (just like billiard balls). In this talk, I will give an introduction to the equations,

- very formally motivate the relation to the microscopic description

- discuss conservation of mass, momentum and energy

- discuss dissipation of entropy and its meaning regarding reversibility of the equations

- and give an overview over existence theory