

**Kinetic modelling and numerics of strongly magnetized
tokamak plasmas with mass disparate particles.
The electron Boltzmann relation.**

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In the present talk I will justify on a formal level the obtention of the electron Boltzmann relation in a suitable asymptotic limit, starting from a fully kinetic description of magnetically confined fusion plasmas. The obtained asymptotic limit model consists of the electron Boltzmann-equilibrium along the magnetic field lines, completed by a non-trivial dynamics perpendicular to these field lines. In the same asymptotic limit, the ions reach a gyrokinetic or hydrodynamic regime. The Boltzmann approximation for the electrons is widely used in numerical simulations in the aim to drastically reduce the computational burden. It is thus crucial to understand how to obtain this reduced model from modelling assumptions and asymptotic considerations, starting from a microscopic description.

Some first numerical examples via an Asymptotic-Preserving scheme permitting to follow on the discrete level this asymptotic limit, will be presented.