About Boltzmann-Maxwell relation and Multiscale Analysis

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This is a report on a paper in preparation with F. Golse, R. Sentis and T. Nguyen. In the description of a plasma involving ions and electrons the following formula:

$$f_-(x,v,t) = (\frac{\beta(t)}{2\pi})^{\frac{d}{2}} e^{-\beta(t)(\frac{|v|^2}{2}-\phi(x,t))}$$

is used to describe the density of electrons. Therefore the present talk is an attempt to justify this relation. It involves an analysis of the different scalings which govern the evolution of the couple system, the proofs of some " if theorems " , some rigorous results on the reduced system and some considerations on Arnold type stability of the full system.