

Efficient numerical resolution of singularly perturbed problems occurring in plasmas

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Strongly magnetic fields in fusion plasmas introduce small time and space scales in the plasma dynamics, which render the numerical resolution of such problems very challenging, requiring often multiscale or homogenisation techniques. These small time and space scales are for example related to the gyromotion of the charged particles around the magnetic field lines, hence to the Larmor radius and the cyclotron frequency. Dependent on the physical phenomena one wants to study, different small scale asymptotic regimes have to be considered. The aim of this talk shall be to present some new advances in the numerical treatment of such singularly perturbed kinetic problems (multiscale Vlasov equation).