Modelling of RMP plasma interaction using a high order FLR expansion scheme

M.F. Heyn¹, I.B. Ivanov³, S.V. Kasilov¹,², W. Kernbichler¹, P. Leitner¹

¹Association Fusion@ÖAW, Institut für Theoretische Physik - Computational Physics, TU Graz, Austria
²Institute of Plasma Physics, National Science Center “Kharkov Institute of Physics and Technology”, Ukraine
³St. Petersburg State University, Institute of Physics, Russia
⁴Petersburg Nuclear Physics Institute, St. Petersburg, Russia

The study of the interaction of resonant magnetic perturbations (RMPs) with a finite ion temperature tokamak plasma requires a proper account of finite Larmor radius (FLR) effects at the resonant layer. For certain conditions at the resonant surface, a coupling to the electrostatic drift mode, which generally has a radial scale of the order of the ion gyroradius, is expected. In the present study a kinetic plasma response model with a stable high order FLR expansion is used to model this interaction. In particular, the possibility of magnetic field amplification which follows already from a qualitative analysis is studied in more detail.