Non-linear MHD Modelling of Plasma Response to Resonant and Non-Resonant Magnetic Perturbations with Rotation and Neoclassical Toroidal Viscosity.

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Resonant Magnetic Perturbations (RMP) generated by specific set of coils have been shown to be effective in eliminating [1] or mitigating [2] Type I Edge Localized Modes (ELMs) in H-mode plasmas in present day experiments. This method of edge control is strongly recommended for ITER [3,4]. The recent modelling results of RMPs penetration into the rotating plasma will be presented. The non-linear reduced MHD codes RMHD (cylindrical geometry) and JOREK (toroidal geometry) were adapted to take into account RMPs, toroidal rotation, resonant braking [5] and Neoclassical Toroidal Viscosity (NTV) [6,7,8]. Plasma response effects such as RMP penetration time parametric dependence, screening of RMPs by plasma rotation and plasma braking due to RMPs and convective density transport are discussed for DIII-D and ITER parameters.

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