RMP induced H-mode transition during divertor detachment with enhanced edge radiation in deuterium plasmas in LHD

National Institute for Fusion Science
kobayashi.masahiro@nifs.ac.jp

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1. Compatibility of good core plasma performance with divertor heat load mitigation
   - RMP induced H-mode transition during divertor detachment with enhanced edge radiation in deuterium plasmas in LHD

2. Change of edge magnetic field structure for study on compatibility of confinement with discharge RMP application - Shafer boundary between confinement region and transition layer

3. Impact of RMP on density limit, saturated power, and plasma energy confinement
   - Density ramp-up discharge with and without RMP application
   - Confinement of enhanced mode transition with cold plasma (40 keV Deuterium) and with particle diffusivity

4. Impacts of RMP on edge plasma profile, pedestal profile, and edge transport barrier at core temperature

5. Edge impurity radiation distribution obtained by 2D imaging spectrometry

6. Confinement mode transitions during RMP (impurity) application
   - Development of low density, high density ramp-up, and MHD in the core plasma
   - Impacts of density and temperature on core plasma confinement

7. Interplay between edge cooling and ETB, and core transport
   - MHD activity degrades ETB - Radiation losses - Confinement mode transition

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   - MHD activity degrades ETB - Radiation losses - Confinement mode transition

9. Development of pedestal during confinement mode transition and T_e scaling
   - After divertor transition, development of pedestal with density increase
   - Similar to standard H-mode transition
   - Degradation due to MHD activity occurs with T_e decrease
   - Confinement improvement proceeds with increase of T_e

10. Divertor heat load pattern in toroidal direction with RMP application - Attraction & detachment phase

11. Divertor peak heat load slightly returns during improved mode

12. Role of edge magnetic field structure in edge plasma detachment and compatibility with core plasma confinement
   - Sharp boundary between confinement region and edge layer can be introduced with RMP (ppm/N)
   - Enhanced confinement at divertor plasma - Higher density, higher radiated power, better confinement are achieved
   - Core transport is improved despite the enhanced confinement in H-mode plasmas

13. Summary
   - Importance of edge magnetic field structure in edge plasma detachment and compatibility with core plasma confinement
   - Edge plasma detachment and improved mode with RMP (10-15 ppm/N)

Key role of edge magnetic field structure in edge plasma detachment and compatibility with core plasma confinement is being investigated.