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PD/P8-05: Electric Potential Dynamics in OH and ECRH Plasmas in the T-10 Tokamak

Friday, 12 October 2012 14:00 (4h 45m)

The new experimental observations of plasma potential by a Heavy Ion Beam Probe diagnostic and theoretical description of the formation of E(r) in the T-10 (circular tokamak, B(0)=1.5-2.5 T, R=1.5 m, a=0.3 m) are presented. OH deuterium plasmas (n(e) = 0.6-4.7x10ˆ19 mˆ–3, T(e) < 1 keV, T(i) < 0.6 keV) are characterized by a negative potential up to phi(0) =-1300 V. The potential profile is monotonically increasing towards the plasma edge. A density rise due to gas puff is accompanied by an increasing negative potential. When density approaches certain value n(e) = 2.5-3.5x10ˆ19 mˆ–3, this growth saturates, while the energy confinement time is still approaching its saturation level. Powerful auxiliary ECRH (P(ECRH) < 3 MW) leads to T(e) increase up to 3 keV and to the decrease of the absolute potential and even change the potential sign to positive at the edge. The potential radial profiles and the dependence on n(e) and T(e) are explained by NC models in the core, while the turbulent dynamic model (Braginskij MHD) explains the edge potential.

Country or International Organization of Primary Author

Russian Federation

Primary author: Mr MELNIKOV, Alexander (Russian Federation)

Presenter: Mr MELNIKOV, Alexander (Russian Federation)

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