

P5.1046 Experimental investigations of MARFE and detached plasma on J-TEXT tokamak

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See full abstract here <http://ocs.ciemat.es/EPS2019ABS/pdf/P5.1046.pdf>

Multifaceted asymmetric radiation as well as strong poloidal asymmetry of the electron density from the edge, dubbed as 'MARFE', has been observed in high electron density Ohmically heated plasmas on J-TEXT tokamak. While the plasma density increasing further, it is found that the MARFE sometimes moves poloidally and evolves into the poloidally symmetric structure with strong radiation at edge, named as "detached plasma" or "detachment". The evolution of MARFE into detachment only occurs in discharges with high safety factor ($q_a > 5$). The physical process from MARFE to detachment has been investigated. It is found that the energy balance between perpendicular loss and parallel transport is critical. While the balance saturates, the MARFE stay at the high field side. Otherwise, the MARFE moves along poloidal direction and evolves into detachment. In addition, the stability of MARFE could be affected by electrode biasing at edge. Here, the ExB poloidal flow acts the dominant role. More details will be discussed in the meeting.

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