

ELM penetration in ITB plasmas on EAST tokamak

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Abstract

ELM penetration in ITB plasmas has been studied on EAST tokamak with central flat $q(0) \sim 1$ safety factor profile recently [1-3]. In JET [4], ITB collapse induced by the large amplitude type I ELMs on the ITB plasma was observed. ECE data showed that when the ELM penetration radius reached to the ITB-foot, ITB shrink inward gradually. In JT-60U, when ELM penetration radius reached to ITB-foot, the ITB width no longer expanded outward and finally reached to a balance state [5]. When the ELM penetration radius reaches to the ITB foot on EAST tokamak, a significant impact on ITB plasma is observed by ITB shrinks or collapses. It is observed that when the ELM penetration starts to decrease the pedestal temperature and density, the ITB collapse is triggered by ELM penetration and the off-axis sawtooth crash on EAST tokamak. The off-axis sawtooth can decrease the core stored energy further on EAST tokamak. The reversal surface of the off-axis sawtooth is around the ITB foot. The delay time between ELM penetration reach to ITB foot and the off-axis sawtooth collapse is about 2~3 ms. Mechanism of ITB collapse from ELM penetration to the off-axis sawtooth triggered is not clear yet. It is also found that the shrinking and expanding of ITB is related with the net heating power. Experiment result and simulation plan for understanding ELM penetration in ITB plasmas on EAST tokamak are summarized and discussed.

References

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