



IAEA FEC 201

Contribution ID: 913

Type: Poster

Global stabilization effect of Shafranov shift on the edge pedestal plasmas in JET and JT-60U

Thursday, 20 October 2016 08:30 (4 hours)

Here we report the global stabilization effect of Shafranov shift on the edge pedestal plasmas. Experimental observations show that (i) the increased Shafranov shift stabilizes the ballooning component of the peeling-ballooning mode (PBM) so that the edge pressure gradient is raised together with the expansion of the edge transport barrier (ETB) and (ii) when the Shafranov shift is fixed the increased collisionality reduces the edge pressure gradient whereas the ETB expands. This physics process has been examined using JET and JT-60U, in both of which the Shafranov shift stabilizes the pedestal most effectively because the pedestal plasmas in these devices are constraint systematically by the ballooning component of the PBM instability. The results will give a physics picture of H-mode edge and core interplay which contributes to an accurate prediction of the ETB structure in ITER.

Paper Number

EX/3-4

Country or International Organization

Japan

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Session Classification: Poster EX/3, EX/4, PPC/1

Track Classification: EXC - Magnetic Confinement Experiments: Confinement