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## **Extension of High-beta Plasma Operation to low collisional Regime**

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Previous experiments in LHD show that high beta plasma with more than 5% was successfully achieved in the high collisional regime because of low magnetic field operation at 0.425 T. To investigate the collisionality dependence of plasma confinement property, we have made high beta experiments in relatively high-field configurations at 1 T to increase the electron temperature. As a result, high-beta plasma with more than 4% was successfully produced by multi-pellet injections in one order lower collisional regime than that of previous high-beta operations. A peaked plasma pressure is formed after the pellet injection, which causes large Shafranov shift and core instability, whereas no confinement degradation is observed then. An improvement of particle confinement was observed during a high-beta discharge produced by gas-puff, and then particle flux to divertor was reduced by more than 40%. Strong instabilities with  $m/n=1/2$  and/or  $2/3$  at plasma edge appeared then and suppressed an increment of averaged beta to 3.4%. Spontaneous change of the magnetic topology contributes to the increase in averaged beta value, while it triggers excitation of edge MHD instabilities.

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