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**Effect of pressure-driven MHD instabilities on confinement in reactor-relevant high-beta helical plasmas**[1]

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Plasmas with 5% volume averaged beta have been routinely produced in the Large Helical Device. The effect of the global modes and short-wave-length turbulence from MHD instabilities on the confinement is assessed. Even in globally stable plasmas, magnetic fluctuations due to MHD modes are observed localized in the plasma periphery, where there is a magnetic hill. They are enhanced as the beta increases and the magnetic Reynolds number decreases. These MHD instabilities are pressure driven because there is no net-current. Comparison of plasmas with and without the global MHD instabilities shows that the instability with a mode width of 5% of the plasma minor radius reduces the energy confinement time by 10%. In addition, the thermal transport in the magnetic hill region degrades gradually as the beta increases. The degradation has a clear correlation with the amplitude of density fluctuations with short wave length. These behaviors are consistent with a transport model based on a resistive interchange driven turbulence. Although the MHD modes do not produce a hard operational limit, this work reports quantitative analysis of their degradation of confinement giving a soft limit.

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