

Transport barriers in non-axisymmetric magnetic fields

K. Ida

ida@nifs.ac.jp

National Institute for Fusion Science, Toki 509-5292, Japan

A transport barrier which is characterized by the steeper temperature or/and density gradient has been observed both in the core region (internal transport barrier : ITB) and edge region (edge transport barrier : ETB) in the plasma with non-axisymmetric magnetic field compared with the gyro-Bohm type L-mode transport. A reduction of thermal conductivity and particle diffusivity in these plasmas compared with the L-mode levels is observed and the parameter dependence of thermal conductivity and particle diffusivity changes significantly from that in L-mode. A negative or at least a weak dependence of thermal diffusivity on temperature is observed in the heat transport barrier, while the strong temperature dependence (temperature power of 1.5) is normally observed in the L-mode region. In this paper, transport barriers that have been observed on the non-axisymmetric magnetic field configuration are discussed from the view point of parameter dependence of transport coefficients not the shape of temperature or density profiles. The transition between the L-mode and improved mode with transport barrier is also discussed based on the idea of bifurcation of multi-state transport (discrete transport states with different relations of heat flux to temperature gradient that are self-consistent to the different turbulence states realized).