Isotope effect on impurity transport and heat transport (K.Ida EX/10-1)

Isotope effect on transport was found to have two steps in LHD.
Primary effect → enhance the inward convection of impurity
Secondary effect → peaked carbon density profile contributes to the reduction of turbulence

Deterium

Mitigation of impurity hole

Stabilization of ITG turbulence

Achievement of higher $T_i(0)$ in D plasma

The sign of the convection of carbon impurity in the ITB region is positive in hydrogen plasma and negative in deuterium plasma

hollow (H) → peaked (D) : Primary effect

Peaked carbon density profile weakens the ITG instabilities

Peaked carbon density contributes to the achievement and sustainment of higher ion temperature in deuterium plasma

$T_i(D) > T_i(H)$ : Secondary effect