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A Model for Energy Confinement Scaling of Tokamak Plasmas with Double Transport Barriers[1] C.-L. HSIEH, B. BRAY, General Atomics — The formation of double transport barriers, one in the plasma interior and the other at the plasma edge, has been observed in many Tokamak experiments for enhancing the plasma energy confinement to a new level. Naturally, the next question is how the confinement varies with changes in global plasma parameters. With the assumption that the discharge is a combination of H-mode and neoclassical transport, a model is being developed to study possible confinement scaling relations. The model takes the plasma as a single fluid (barrier affects both electrons and ions) and divides it into three regions: the central, the barrier and the outer regions, with neoclassical diffusivity for the barrier region and the H-mode diffusivity for the others. The H-mode diffusivity is derived entirely from experimental observations and it is capable of reproducing the electron temperature profile and the confinement scaling relation of H-mode plasmas. The model leaves the location and the width of the barrier region as variables since it is not clear at present what is their dependence on the plasma parameters.

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