

Abstract Submitted
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Possible Role of Pinch Terms in the Formation of an Internal Transport Barrier in Tokamak Plasmas¹ C. HSIEH, B. BRAY, General Atomics, G. DIAO, Southwestern Institute of Physics, F. YIN, IPP, Academia Sinica — An internal transport barrier (ITB) has been observed to have two important features, namely, the reduction of ion thermal diffusivity to neoclassical values and an improvement in confinement accompanied by increases in both the plasma density and temperature. The formation of such a barrier is generally thought to be a result of the suppression of plasma instabilities. However, it appears the barrier could also be formed alternatively by a pinch process. A pinch model is developed to study its effects on plasma transport and analytical solutions are obtained. The pinch has two parts: a particle pinch and a thermal pinch. The pinch terms can push both the density and temperature gradients to high values so the outward diffusive particle and heat flows can balance the corresponding inward pinch flows. Since the profiles are modified heavily by the pinch process, the diffusivity reduction observed is really a manifestation of the pinch effect. Comparisons with JT-60U ITB plasmas show the model reproduces the measured temperature and density profiles.

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Prefer Oral Session
 Prefer Poster Session

C. Hsieh
hsieh@gav.gat.com
General Atomics

Special instructions: DIII-D Poster Session I (transport, turbulence, & stability), immediately following Gohil

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