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Energy Confinement Improved with Neon Injection in the DIII–D Tokamak[1] G.M. STAEBLER, G.L. JACKSON, W.P. WEST, R.J. GROEBNER, M.J. SCHAFFER, General Atomics, S.L. ALLEN, Lawrence Livermore National Laboratory, D.G. WHYTE, University of California, San Diego — DIII–D IL–mode discharges with neon injection have improved energy confinement 1.3–2.0 times the pre-neon L–mode phase. Power balance analysis of an IL–mode shows that the electron and ion thermal diffusivities are reduced in the center. The measured neon 10^+ density is peaked like the electron density. The neon 10^+ fraction is less than 1% (normalized to the electron density). The shear in the E×B velocity is found to exceed the maximum growth rate of the ion temperature gradient (ITG) mode in the center providing a mechanism for the reduced transport. Some of the IL–mode discharges make a transition into an IH–mode. The energy confinement during the ELM free IH–mode is up to three times L–mode. Power balance analysis shows that the suppressed central transport of the IL–mode remains after the edge transport barrier forms. The neon 10^+ density drops in the center and rises strongly at the edge after the IH–mode transition.

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