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Confinement in Advanced Inductive Plasmas - Gyroradius and Rotation[1] T.C. LUCE, P.A. POLITZER, GA, C.D. CHALLIS, Euratom/CCFE, E. JOFFRIN, Euratom/CEA, W.M. SOLOMON, PPPL — Advanced inductive (AI) plasmas promise long pulse operation and high fusion yield. We address issues of extrapolation to ITER and beyond. First, joint JET & DIII-D work studies the scaling of transport with size (ρ^*). Preliminary 0-D analysis indicates that global scaling is close to Bohm-like: $B\tau_E \propto \rho^{*-\alpha}$ with $\alpha \approx 2.16$. For matched discharges H_{98y2} depends weakly if at all on ρ^*. Second, the dependence of confinement on rotation and on the presence of an NTM island was studied in DIII-D. Rotation was varied by a factor of ∼4.6 in plasmas with similar n_e and β, with $3.1 \leq q_{95} \leq 4.9$. H_{89} increased from ∼2.0 to ∼2.5, with weak q_{95} dependence. Increasing $E \times B$ flow shear is dominant, accompanied by a decrease in turbulence. Decreasing NTM island width is less important, but not negligible. Third, with added ECH, T_e/T_i increases but energy and momentum transport increase as well. Matching NBI and ECH heated plasmas shows that the reduction in density with ECH is a consequence of reduced rotation rather than changing T_e/T_i.

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