Confinement in Advanced Inductive Plasmas - Gyroradius and Rotation\textsuperscript{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 ($\rho^*$). 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 $H_{98\psi}$ depends weakly if at all on $\rho^*$. 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 $\sim 4.6$ in plasmas with similar $n_e$ and $\beta$, with $3.1 \leq q_{95} \leq 4.9$. $H_{89}$ increased from $\sim 2.0$ to $\sim 2.5$, 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 $T_e/T_i$.

\textsuperscript{1}Work supported by the US DOE under DE-FC02-04ER54698 and DE-AC02-09CH11466.