**Equilibrium analysis of W7-AS high-beta plasmas**[1] M.C. ZARN-STORFF, A. REIMAN, PPPL, J. GEIGER, A. WELLER, IPP-Greifswald — The equilibrium for W7-AS high-beta plasmas is reconstructed, fitting the magnetic diagnostic measurements and the Thomson-scattering pressure profile. Principal component analysis indicates that the available magnetic diagnostics are sensitive to two moments of the current profile and three moments of the pressure profile. The total plasma toroidal current is nulled using a feedback controlled ohmic current. The reconstructed equilibria show small local toroidal net-current, from the combindation of the ohmic, bootstrap and beam currents, which can reduce the central rotational transform by $\sim 0.1$. Analysis of the free-boundary equilibria by PIES indicates that the magnetic field near the plasma edge becomes increasingly stochastic as beta increases. The achieved maximum beta-value in the configurations examined corresponds to a calculated loss of the outer $\sim 35\%$ of the minor radius to islands and stochastic fields. Thus, the beta-limit and its variation may be due to confinement degradation due to flux-surface break-up. The parametric variation of the calculated equilibrium properties will be presented. Extensions of this analysis to LHD will be discussed.

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