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Transport and Turbulence Studies on HL-2A Tokamak X.R. DUAN, Southwestern Institute of Physics, HL-2A TEAM — In this paper the results of turbulence and transport studies on HL-2A tokamak are summarized. Using the density profile and perturbation analysis, a spontaneous and quasi-steady state particle transport barrier has been evidenced in the ohmic plasmas on HL-2A tokamak without external momentum or particle input. A density threshold for the occurrence of the barrier was identified. The particle diffusivity profile is well-like, and the convection is found to be inward outside the well, and outward inside the well. The formation of the barrier coincides with the TEM/ITG transition. The non-local transport with new features induced by SMBI fuelling has been investigated. The results show that the duration of core T_e rising depends on the SMBI modulation parameters and may be prolonged. The distinct characteristics of low frequency quasi-mode (QM) fluctuations of several ten kilohertz and the higher frequency ambient turbulence (HFAT) of 100 kHz or higher are measured with high spatiotemporal resolution Langmuir probe arrays. Three dimensional wave number spectra and dispersion relations are investigated. Besides, **t**he toroidal symmetry of the low frequency zonal flow of f<4 kHz is identified with toroidally distributed the probes in the edge plasma for the first time. In addition, the mode structure of the density fluctuation at GAM frequency is observed.

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