Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Transport Studies of Electric Field in Helical Plasmas S. TODA, K. ITOH, National Institute for Fusion Science — In the compact helical system (CHS), the steep gradient of the radial electric field has been observed in the inner plasma region and the transport barrier was found in the ECRH plasma. The similar structure in the electron temperature profile has been observed in the Large Helical Device (LHD). A pulsating behavior of electrostatic potential (or the radial electric field) was also observed in CHS. We have analyzed the one-dimensional transport equations which describe the temporal evolutions of the density, the electron and ion temperatures, and the radial electric field in a cylindrical configuration. The transport model for anomalous diffusivities was used to describe the turbulent plasma. At first, we compare the analysis results with the experimental results in LHD to discuss the validity of the physical process employed in one-dimensional theoretical study. Next, we examine the two dimensional (radial and poloidal) profile of the electric field. Two dimensional transport equations which include the temporal evolution of the electric field are used. The electric filed is assumed to be determined by the ambipolar condition which is constituted with the neoclassical particle flux for the non-axisymmetric part. We include the effect of the inward particle pinch to examine the temporal oscillation of the electric field. The parameter regime in which the temporal oscillation of the radial electric field is predicted will be shown.

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Date submitted: 19 Jul 2005 Electronic form version 1.4