

Summary of H-mode studies in Compact Helical System

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In about five years in the last phase of CHS experiment, H-mode physics was intensively studied. As well as a clear signal drop in the H α emission, quick changes in the local densities gave reliable evidences of the bifurcation phenomena in the particle confinement in the plasma edge (edge transport barrier: ETB). Full diagnostics installed on CHS showed variations of profile information for the confinement improvement. In addition to the basic profile measurements of electron density and temperature by Thomson scattering, ion temperature and rotation measurements by the charge exchange spectroscopy showed the enhancement of the electric field during the H-mode, and the beam emission spectroscopy (BES) gave high speed measurements of local density variation which became available only at the last phase of CHS experiment. New diagnostics for the density fluctuation (BES, microwave scattering and phase contrast method of YAG laser) became also available in the last phase of CHS experiment. They observed clear suppression of the density fluctuations at the time of H-mode transition. Flexible controllability of the experimental conditions in CHS (heating power, density, magnetic field strength and configuration control) made it possible to study physical condition for the H-mode transition more carefully. High density H-mode operation combined with the reheat mode was an example of the successful extension of the improved confinement operation of CHS plasmas. This paper will summarize whole results of H-mode studies obtained in CHS experiment and try to evaluate the benefits of H-mode in CHS plasmas.