Transport simulation of ECRH H-mode experiments on NCST

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Abstract

H-mode can be achieved using various auxiliary heating methods, such as neutral beam injection (NBI) heating, ion cyclotron range of frequency (ICRF) heating, electron cyclotron resonance heating (ECRH), and low hybrid resonance heating. Consequently, H-mode is recognized as a general phenomenon that occurs regardless of the specific auxiliary heating method used. Transport simulations of ECRH H-mode experiments on the NanChang Spherical Tokamak (NCST) were conducted, revealing that the initial electron and ion temperature profiles significantly affect the L-H transition. A larger initial temperature gradient at the edge plasma benefits this transition. The simulation results demonstrate that ECRH H-mode can be achieved with appropriate initial electron and ion temperature profiles under the current discharge conditions on the NCST. Additionally, the evolutions of electron and ion temperature profiles were calculated.

Keywords: plasma simulation, ECRH, H-mode