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The Observation of Pedestal Turbulence Contributing Inward Particle and Heat Flux on the Edge of HL-2A Tokamak

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The theoretical and experimental results indicate that the total confinement of the core plasma in a fusion device relies on the structure of pedestal on the edge, and the pedestal turbulence plays an essential role on the pedestal structure. The pedestal turbulence have been studied by using the Langmuir probe arrays on the edge of HL-2A tokamak. The probe arrays were performed about 1cm inside the separatrix With the NBI heating power of 0.7MW and ECRH power of 1MW, some kind of low frequency (20~80kHz) pedestal turbulence (shorted for LFT) with large amplitude has been observed during the construction and recovery of pedestal on HL-2A. The LFT begins to excite with the increasing of local electron density and temperature. Amplitude of LFT is large about ~250V in the potential field, while the corresponding magnetic fluctuations of LFT is weak. The abnormal particle and heat flux contributed by LFT have also been measured by four-tip probe. The result shows that the LFT contributed inward particle and total heat flux during the construction and recover of the pedestal on HL-2A. Those results may indicate a physical mechanism of the construction of the pedestal after the L-H mode transition, as well as the recovery of pedestal between ELMs.

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