Dithering H-mode triggered by sawtooth on the MAST-U tokamak

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Dithering H-mode induced by sawtooth crash events has been achieved in discharges with marginal auxiliary power injection for the first time in MAST-U spherical tokamak. The dithering H-mode is characterized by deduction of D_{α} emission, suppression of turbulence and formation of pedestal at the edge. There is No ELMs during the H-mode region. The L-H transition appears just after the sawtooth crash, and the H-mode can last more than 10 *ms*. The turbulences and flows during the L-H transition have been investigated using two Doppler Backscattering (DBS) diagnostic systems. A low-frequency (~1*kHz*) Zonal flow ($k_{\theta} \approx 0$ can be confirmed by two DBS systems) is observed during the transition. Accompanied with the Zonal flow, a turbulence with ion diamagnetic propagating direction can be observed. These experimental observations suggest that the Zonal flow triggers the L-H transition, and the ITG-like ion turbulence is the main energy source of the Zonal flow.