A Novel Turbulence Transition Induced by Lower Hybrid Wave in an ELMy H-mode Pedestal at EAST

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Abstract: We report a turbulence transition in an edge-localized-mode (ELMy) Hmode pedestal when modulating the injected power of lower hybrid wave (LHW) arming at surveying its impact on ELM behavior. Simultaneous measurements of lithium beam emission spectroscopy (measuring larger-scale electron density fluctuation with perpendicular wavenumber k_{\perp} below 3 cm⁻¹) and Doppler backscattering system (measuring smaller-scale electron density fluctuation with k_{\perp} usually larger than 3 cm⁻¹) show that the dominant electron density fluctuation in the pedestal region transits from the edge coherent mode (ECM) to a broadband fluctuation (BBF) with a more radially-localized distribution as the LHW is switched on. Comparing edge profiles with and without LHW suggests that the LHW-induced decrease in the edge electron collisionality seems to account for such a suppression of ECM with the nature of a dissipative trapped electron mode (DTEM), and subsequently allowing for the generation of the BBF. This work may shed more light into the underlying physics behind LHW's influence on ELMs.