

# Localized modulation of turbulence by magnetic islands on HL-2A tokamak

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Magnetic islands formed in magnetically confined plasmas have significant influence on plasma profiles and cross-field transport, and can even cause plasma disruption [1,2]. However, observations of internal transport barriers near the rational magnetic surface suggest the importance of magnetic islands in plasma confinement via increase of flow shear at the island boundary [3,4]. In recent years the multi-scale interaction between large-scale modes and micro-scale turbulence has been found to play an important role in regulating turbulent transport and eventually form the low to high mode transition [5,6]. In this paper, modulation on turbulent electron temperature fluctuations and density fluctuations by an  $m/n = 1/1$  tearing mode island was observed in the core plasma region of the HL-2A tokamak. High tempo-spatial resolution two-dimensional images of temperature fluctuations show the first evidence that the turbulence modulation occurs only when the island width exceeds a certain threshold value (6.4 cm) and the modulation is localized merely in the inner half area of the island due to significant alteration of local profiles and turbulence drives. Evidence also reveals that for large islands turbulence spreading takes place across the flat temperature of the O-point at the inner half island region, whereas in the outer half area the small temperature gradient drives a low level of temperature fluctuations.

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