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(POS-39) Diamagnetic Dynamo Driven Current Transport In EAST Tokamak

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The fluctuation-induced dynamo electric field has been measured in the core of high-temperature EAST tokamak plasmas using Faraday-effect polarimetry and electron cyclotron emission (ECE). The magnetic amplitude of the kink mode (m/n = 1/1) saturates at 30–50 Gauss inside the q = 1 resonant surface. Electron temperature fluctuations reach up to 10% near the resonant surface, where the gradient of electron pressure exhibits a local maximum. These temperature fluctuations are predominantly driven by magnetic perturbations, and a correlation between electron temperature and radial magnetic fluctuations gives rise to a non-vanishing parallel dynamo electric field on the order of 10 mV/m, which is comparable to the resistive electric field ($\eta_\parallel J$). The dynamo electric field is capable of flattening the current profile, thereby facilitating the achievement of "hybrid" modes in a steady-state magnetic equilibrium.

Keyword-1

tokamak

Keyword-2

dynamo

Keyword-3

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