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P5.1079 A mechanism of neoclassical tearing modes onset by drift wave turbulence

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The evolution of neoclassical tearing modes (NTMs) in the presence of electrostatic drift wave turbulence is investigated. In contrast with anomalous transport effect induced by turbulence on NTMs, a new mechanism that turbulence-driven current can affect the onset threshold of NTMs significantly is suggested. Turbulence acts as a source or sink to exchange energy with NTMs. The turbulence-driven current can change the parallel current in magnetic islands and affect the evolution of NTMs, depending on the direction of turbulence intensity gradient. When the turbulence intensity gradient is negative, the turbulence-driven current enhances the onset threshold of NTMs. When the turbulence intensity gradient is positive, it can reduce or even overcome the stabilizing effect of neoclassical polarization current, leading to a small onset threshold of NTMs. This implies that NTMs can appear without noticeable magnetohydrodynamics (MHD) events.

References
[1] Huishan Cai, 2019 Nucl. Fusion 59 026009

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