

Abstract Submitted  
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**Influence of energetic ions on neoclassical tearing modes** HUIZHAN  
CAI, Univ of Sci Tech of China — In addition to their effect on the linear stability of tearing modes, energetic particles can influence the nonlinear evolution of a magnetic island through an uncompensated cross field current due to the charge separation effect when energetic particle orbit width is much larger than the island width. The corresponding return parallel current may compensate the loss of bootstrap current in the magnetic island. This nonlinear effect depends on the island propagation frequency, the density gradient of energetic ions and magnetic shear. If the island propagation frequency is positive, the effect of the uncompensated current plays a stable role on neoclassical tearing modes. When the magnetic shear is sufficiently small, this effect becomes significant and can partially cancel or even overcome the destabilizing effect of the perturbed bootstrap current. In ITER this provides a possibility of suppressing neoclassical tearing mode by energetic ions for the steady state operation scenario with weak magnetic shear.

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