EX/10–4: Effects of MHD instabilities on Neutral Beam current drive


Neutral Beam heating and current drive are crucial for the success of ITER, Fusion Nuclear Science Facility (FNSF).

MHD instabilities (e.g. Alfvénic modes, AEs) can reduce NB-CD efficiency.

A new model is developed to quantify and predict AE effects on NB-CD [Podestà, PPCF 56 (2014) 055003]

- Fast ion evolution is consistently treated in phase space (energy, canonical angular momentum, magnetic moment).
- Interactions modeled through kick probability $p(\Delta E, \Delta P_\zeta | E, P_\zeta, \mu)$.
- Implementation in the transport code TRANSP under way.

Results from NSTX confirm strong effect of AEs on NB-CD

- Up to 40% of local current density can be redistributed.
- Effects not correctly accounted for by models based on ad-hoc spatial diffusion.