**Topics: TH.W**

**Critical gradient and kick models for fast ion profile relaxation in fusion plasmas and their validations***

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We report on two models for EP profile relaxation due to Alfvénic modes that are based on linear Alfvénic eigenmodes (AE) stability theory. The first model is the critical gradient model (CGM) where the EP pressure gradient is computed for the drive to overcome the background damping. The second is the kick model where the realistic probability function of particle displacement in the phase space is computed using the guiding center ORBIT code in the presence of TAE mode structures.

We apply both models for validations in NSTX and DIII-D plasmas with neutral beam heating where fast ions were redistributed in radius in the presence of Alfvénic activity. In the DIII-D shot we have found that both models agree with each other in terms of neutron flux deficit. However the deficit was found by approximately a factor of two less than the measured deficit. For NSTX discharge both models predict the neutron deficit to be within the experimental error bars from the measured deficit. The disagreement with DIII-D measurements points at the potentially important role the low frequency part of measured sub-Alfvénic spectrum plays in EP redistribution since this part of the spectrum is not included in both models.

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