Abstract Submitted
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Validation of quasilinear models for fast ion relaxation due to Alfvén Eigenmodes for burning plasmas[1] NIKOLAI GORELENKOV[2], PPPL, Princeton University — We offer and validate reduced quasi-linear models to describe the relaxed fast ion (FI) profiles expected in the presence of Alfvénic modes in tokamaks and apply it to projected ITER plasma conditions. The focus of this presentation is on the 1.5D model, which is being applied and validated against recent DIII-D experiments. These experiments were well diagnosed for a number of validating goals. With the parametric dependencies embedded in the presented analytic model and with the quantitative normalization coming from NOVA-K modeling the 1.5D diffusion is successfully validated against that data. The agreement is achieved for the absolute values and for the time behavior of the fast ion losses as the AE activity approaches the threshold conditions. Given its validation the model can be applied to future burning plasma experiment, such as ITER, with or without the NOVA-K-like numerical growth rate normalization. Moreover, more complete, 2D, approach to the quasi-linear diffusion is being developed, which covers a variety of cases in term of the instability excitation when the unstable modes exhibit themselves as isolated modes, partially isolated modes and completely overlapped modes.

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