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Abstract Submitted
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Building 1D resonance broadened quasilinear (RBQ) code for fast ions Alfvnic relaxations NIKOLAI GORELENKOV, PPPL, Princeton University, VINICIUS DUARTE, University of So Paulo, Brazil, HERBERT BERK, Institute for Fusion Studies, University of Texas — The performance of the burning plasma is limited by the confinement of superalfvenic fusion products, e.g. alpha particles, which are capable of resonating with the Alfvnic eigenmodes (AEs). The effect of AEs on fast ions is evaluated using a resonance line broadened diffusion coefficient [Berk et al., Phys.Plasmas v.3 (1996) 1827]. The interaction of fast ions and AEs is captured for cases where there are either isolated or overlapping modes. A new code RBQ1D is being built which constructs diffusion coefficients based on realistic eigenfunctions that are determined by the ideal MHD code NOVA [Cheng, Phys. Reports v.211 (1992) 1]. The wave particle interaction can be reduced to one-dimensional dynamics where for the Alfvnic modes typically the particle kinetic energy is nearly constant. Hence to a good approximation the Quasi-Linear (QL) diffusion equation only contains derivatives in the angular momentum. The diffusion equation is then one dimensional that is efficiently solved simultaneously for all particles with the equation for the evolution of the wave angular momentum. The evolution of fast ion constants of motion is governed by the QL diffusion equations which are adapted to find the ion distribution function.

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