

Abstract Submitted
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Quasilinear Relaxation of Alpha Particle Profiles in Burning Plasmas¹ KATY GHANTOUS, N.N. GORELENKOV, M. ZARNSTORFF, Princeton Plasma Physics Lab — Using local quasilinear theory and analytic methods, we reconstruct the relaxed fast ion profile in burning plasmas and get information on the losses. With a local alpha drive and background dampings of TAE modes, we compute the critical alpha particle beta profile beyond which the modes destabilize. Previous local theory is improved by including more sophisticated damping and drive mechanisms such as the effect of alpha particle finite orbit width. Solving the equation for this threshold condition in the unstable regions, and taking into account conservation laws, we integrate a relaxed profile for the alpha particles and deduce losses if any. The theory allows to predict ITER scenarios with good alpha confinement where it is hazardous to operate in regimes with more than 5% losses of energetic particles.

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Katy Ghantous
Princeton Plasma Physics Lab

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