

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Particle distribution modification by magnetohydrodynamic modes ROSCOE WHITE, Princeton University, NIKOLAI GORELENKOV, WILLIAM HEIDBRINK, MICHAEL VAN ZEELAND, DAVID PACE — It is known that low amplitude magnetohydrodynamic (MHD) modes can produce modification of high energy particle distributions, and also significant losses.¹ This phenomenon is important particularly for the redistribution of alpha particle distributions in burning plasmas. Methods are examined for predicting the stochastic onset of large scale transport of a high energy particle distribution in tokamak plasmas due to a spectrum of MHD modes. The phase space of particle orbits is modified by resonant modes by the production of islands in which particles are trapped in the wave. When these islands overlap stochastic trajectories are made possible leading to large scale motion of the particles. Predicting the location and extent of the resonant islands and stochastic domains can lead to a rapid understanding of the proximity of global avalanche.

¹R. B. White, N. Gorelenkov, W. W. Heidbrink, and M.A. Van Zeeland *Plasma Physics and Controlled Fusion*, 52 045012 (2010)

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Date submitted: 25 Jun 2010

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