Turbulence Spreading and Zonal Flow Evolution - A Non-Perturbative Theory A. ULVESTAD, M. MALKOV, P.H. DIAMOND, CASS, U.C.S.D. — The interplay of turbulence spreading and zonal flows has been a subject of controversy in recent years. Previous work on this subject has utilized perturbative, weak-coupling approaches (i.e. turbulence closures, envelope expansions, etc) to address this subject. Many of these calculations do not properly conserve momentum between fluctuations and flows. In this work, we study solutions of an asymptotic (i.e. eikonal) model without the use of a perturbative expansion. The model conserves momentum between fluctuations and zonal flows by treating the radial flux of turbulence potential enstrophy in the flow momentum balance. Results indicate intensity propagation depends strongly on fluctuation and flow dissipation profiles.

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Date submitted: 22 Jul 2009

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