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Turbulent impurity transport in ITER based on theory and CMOD data W. HORTON, SEAN FU, Institute for Fusion Studies, W. ROWAN, I.O. BESPAMYATNOV, S. FUTATANI, Universite de Provence, Case 321, 13397 Marseille Cedex 20, France, S. BENKADDA, University of Texas at Austin, INSTITUTE FOR FUSION STUDIES COLLABORATION, INTERNATIONAL INSTITUTE FOR FUSION SCIENCE COLLABORATION — A key ITER issue is the turbulent radial transport from drift waves of impurities, especially beryllium. Impurtiy transport has been important in earlier tokamak transport research TFTR, CMOD and is treated for ITG in Dong and Horton, 1995. A new formulation based on nonlinear interactions of the dim=4 vector field associated with the eigenvalues and eigenvectors is formulated and solved for ITER parameters and for CMOD with Boron impurity. In a low dimensional truncation of the turbulence we find the bifurcations between L , H and ITB confinement regimes. Three-component fluid equations are used to find the eigenmodes and eigenfrequencies of the nonuniform, magnetized plasma with a four dimensional fluctuation vector X(k,n) composed of fluctuations of the electron density, the working gas ion density, the impurity density and the electrostatic plasma potential. The nonlinear dynamics is evaluated in (i) the collisional drift waves appropriate for the scrape off layer (SOL) and the edge plasma in limiter discharges and in (ii) the trapped electron mode-ITG core plasma taken in the limit of a Terry-Horton model. The particle fluxes are a function of the power spectrum of the plasma potential fluctuations and the gradient parameters charactering the L, H and ITB confinment modes. Fluctuation levels are taken from simulation.

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