Limit Cycle Oscillations and L/H Transitions from Two Dimensional Mean Field Momentum Transport Equations

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Abstract.   The time evolution of one dimensional in space mean field particle, energy, toroidal and parallel momentum transport equations are shown to admit limit cycle oscillations (LCO) or dithering L/H transitions. The LCO is caused by the coupling of parallel and toroidal momentum transport equations but energy and particle transport is also impacted by the oscillations. It is shown that the observed radial profiles of the ExB and poloidal velocities near the separatrix can be understood from the two dimensional momentum transport properties. Experimental data is used to evaluate the coefficients of a reduced transport model and to demonstrate that the model LCO solutions compare well with measurements of a dithering H-mode.