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Transport and the neoclassical tearing mode: Slab geometry PAVEL POPOVICH, SIMON ALLFREY, STEVEN COWLEY, CMPD, UCLA — Due to very long discharges in ITER, NTMs can potentially grow to large widths, increasing transport and significantly degrading confinement. Understanding the processes of the island growth and their impact on the transport is thus of crucial importance. We are presenting a model of the NTM based on an expansion of the Fokker-Planck equation. As a first step, we will consider the islands in a curvature-free slab geometry (see also [1]). We are interested in the islands of the size such that the parallel transport around the island along the magnetic field lines happens on the same time scale as the radial transport across the island, $\chi_\parallel/l_\parallel^2 \sim \chi_\perp/w^2$. Assuming classical diffusion along the field lines and gyro-Bohm-like transport in the perpendicular direction, we obtain the scaling for the island width as $w \sim \sqrt{\rho_i L}$, which is the minimum island width for bootstrap drive (due to profile flattening). Using $\rho^{*1/2}$ as the expansion parameter, solution of the Fokker-Planck equation yields 2-D equations for the evolution of the electron and ion distribution functions. These equations are solved subject to boundary conditions provided by matching to an external MHD solution.

[1] S.J. Allfrey, P. Popovich and S.C. Cowley, 'The Neoclassical tearing mode: An anomalous transport process' (this conference).

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