A stepped pressure profile model for internal transport barriers\textsuperscript{1}
MATTHEW HOLE, Australian National University, STUART HUDSON, Princeton Plasma Physics Laboratory, ROBERT DEWAR, Australian National University — We develop a multiple interface variational model, comprising multiple Taylor-relaxed plasma regions separated by ideal MHD barriers. The magnetic field in each region is Beltrami, $\nabla \times \mathbf{B} = \mu \mathbf{B}$, and the pressure constant. Between these regions the pressure, field strength, and rotational transform $\iota$ may have step changes at the ideal barrier. A principle motivation is the development of a mathematically rigorous ideal MHD model to describe intrinsically 3D equilibria, with nonzero internal pressure, using robust KAM surfaces as the barriers. As each region is locally relaxed however, such a model may also yield reasons for existence of internal transport barriers (ITBs). Focusing on the latter, we build on Hole et al Nuc. Fus. 47, pp746-753, 2007, which recently studied the stability of a two-interface periodic-cylinder configuration. In this work, we perform a stability scan over pressure and $\iota$ for a two-interface configuration with no jump in $\iota$, and compare the characteristics of stable equilibria to those of ITB’s.

\textsuperscript{1}The authors would like to acknowledge the support of the Australian Research Council, through grant DP0452728.