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The effect of finite parallel thermal conductivity on pressure-induced magnetic islands in three-dimensional equilibria[1] M. SCHLUTT, C.C. HEGNA, University of Wisconsin — A boundary layer analysis is used to investigate the formation of pressure-induced magnetic islands in three dimensional stellarator equilibria using a resistive MHD model. Previous analytic calculations have assumed effectively infinite heat conduction along the magnetic field lines. However, if the islands are sufficiently small in width, there is a competition between parallel and perpendicular transport processes due to the very long distance path along the magnetic field in the island region. The present calculation revisits the analytic island work using expressions for the pressure profile that account for the effect of finite parallel heat conductivity. The resulting analysis aims to provide a unifying theory for pressure-induced islands in three-dimensional equilibria encompassing both extreme limits of the parallel transport processes in the island region.

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