

Nonlinearly Saturated Ideal Magnetohydrodynamic Equilibrium States with Periodicity-Breaking in Stellarators

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The relaxation of the constraint of periodicity imposed by the external confining magnetic field coils in a nominally 4-field period Helias Advanced Stellarator configuration produces weak periodicity-breaking deformations of the plasma. The corrugations are driven by the interaction of the pressure gradient with the magnetic field line curvature and correspond to saturated ideal magnetohydrodynamic interchanges with a mode structure dominated by nonresonant $m = 1$, $n = \pm 1$ Fourier components. Very similar low order mode number oscillations are observed in the 4-field period TJ-II Helic stellarator. The conditions of quasi-isodynamicity of the Helias reactor system investigated are not significantly altered by the periodicity-breaking distortions.

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