

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 Heliac 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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Primary author: Dr COOPER, Wilfred (ChEPFL)

Co-authors: Mr KLEINER, Andreas (CHEPFL); Dr LÓPEZ-BRUNA, Daniel (EsLNF); Prof. CASTEJÓN, Francisco (EsLNF); Mr PATTEN, Hamish (CHEPFL); Dr FAUSTIN, Jonathan M (DEMPPIGRIF); Dr GRAVES, Jonathan P. (ChEPFL); Dr RAGHUNATHAN, Madhusudan (ChEpFL); Dr OCHANDO, Maria Antonia (EsLNF); Mr LANTHALER, Samuel (CHEPFL)

Presenter: Dr LÓPEZ-BRUNA, Daniel (EsLNF)

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