1C51

Power plant study of compact stellarators

P.R. Garabedian
Courant Institute of Mathematical Sciences
New York University
New York, NY 10012

Abstract

The NSTAB code has been run to show that the LHD stellarator is linearly unstable, but remains nonlinearly stable, at the β of 3.2% achieved experimentally. At observed temperatures of 3 keV the TRAN code predicts an energy confinement time of 160 ms that agrees with measured values. Predictions of ballooning stability for the LHD are more pessimistic than estimates from bifurcated solutions calculated over 1, 2, 5 or 10 periods.

Good correlation of computations with observations in the LHD have been applied to assess equilibrium, stability, and transport for a quasiaxially symmetric MHH2 stellarator. A reactor has been designed that has major radius 9~m and plasma radius 3~m. The β limit is 4.5%, and 12 only moderately twisted coils provide robust magnetic surfaces.

Work supported by U.S. Department of Energy Grant No. DE-FG02-86ER53223.