

Abstract Submitted
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Progress Toward Improved Compact Stellarator Designs¹ G.H. NEILSON, T. BROWN, D. GATES, L.P. KU, S. LAZERSON, N. POMPHREY, A. REIMAN, M. ZARNSTORFF, PPPL, L. BROMBERG, MIT, A. BOOZER, Columbia Univ., J. HARRIS, ORNL — Stellarators offer robust physics solutions for MFE challenges— steady-state operation, disruption elimination, and high-density operation— but require design improvements to overcome technical risks in the construction and maintenance of future large-scale stellarators. Using the ARIES-CS design (aspect ratio 4.56) as a starting point, compact stellarator designs with improved maintenance characteristics have been developed. By making the outboard legs of the main magnetic field coils nearly straight and parallel, a sector maintenance scheme compatible with high availability becomes possible. Approaches that can allow the main coil requirements to be relaxed in this way are: 1) increase aspect ratio at the expense of compactness, 2) add local removable coils in the maintenance ports for plasma shaping, and 3) use passive conducting tiles made of bulk high-temperature superconducting material to help shape the magnetic field. Such tiles would be arranged on a shaped, segmented internal support structure behind the shield.

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