

Abstract Submitted  
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**Compact Stellarator Path to DEMO**<sup>1</sup> J.F. LYON, Oak Ridge National Laboratory, U.S. STELLARATOR COMMUNITY COLLABORATION — Issues for a DEMO reactor are sustaining an ignited/high-Q plasma in steady state, avoiding disruptions and large variations in power flux to the wall, adequate confinement of thermal plasma and alpha-particles, control of a burning plasma, particle and power handling, etc. Compact stellarators have key advantages – steady-state high-plasma-density operation without external current drive or disruptions, stability without a close conducting wall or active feedback systems, and low recirculating power – in addition to moderate plasma aspect ratio, good confinement, and high-beta potential. The ARIES-CS study established that compact stellarators can be competitive with tokamaks as reactors. Many of the issues for a compact stellarator DEMO can be answered using results from large tokamaks, ITER D-T experiments and fusion materials, technology and component development programs, in addition to stellarators in operation, under construction or in development. However, a large next-generation stellarator will be needed to address some physics issues: size scaling and confinement at higher parameters, burning plasma issues, and operation with a strongly radiative divertor. Technology issues include simpler coils, structure, and divertor fabrication, and better cost information.

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