

Abstract Submitted  
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**The impact of profile variability on bootstrap current and ballooning stability in W7-X**<sup>1</sup> A.S. WARE, University of Montana, S.P. HIRSHMAN, Oak Ridge National Laboratory — The impact of a range of density, electron temperature, and ion temperature profiles on self-consistent bootstrap current, ballooning stability and the magnetic structure of equilibria in computational studies of the W7-X stellarator is examined. Previous work has shown that even a small bootstrap current can change the rotational transform profile and thus, change the magnetic configuration, especially in the edge region. In this work, free-boundary equilibria for the W7-X coil configuration have been obtained over a range of pressure, density and temperature profiles, including equilibria with self-consistent bootstrap current (i.e., where the plasma current is solely from the bootstrap current). The impact of these profiles on bootstrap current, magnetic structure in the edge, and ballooning stability is examined. The formation of islands in the edge regions and correlation with ballooning stability is discussed. Methods of ameliorating the impact of bootstrap current will be discussed.

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