

Abstract Submitted  
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**Impact of self-consistent bootstrap current on the magnetic structure of W7-X**<sup>1</sup> P.S. BURNS, A.S. WARE, University of Montana — The impact of self-consistent bootstrap current on the magnetic structure of equilibria in computational studies of the W7-X stellarator is examined. While one of the criteria in designing W7-X was the minimization of the bootstrap current, at finite- $\beta$  there will likely still be some residual bootstrap current. 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 at a range of  $\beta$  values and the bootstrap current has been calculated for each. An optimization is underway to obtain equilibria with self-consistent bootstrap current (i.e., where the plasma current is solely from the bootstrap current). The impact of both finite- $\beta$  and bootstrap currents on the magnetic structure in the edge will then be examined using the SIESTA code [Hirshman, *et al.*, Phys. Plasmas **18**, 062504 (2011)].

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Andrew Ware  
University of Montana

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