

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**Advancement towards a free boundary SIESTA**<sup>1</sup> M. CIANCIOSA, S.K. SEAL, Oak Ridge National Laboratory — Advanced stellarators purposely break the nested topology of equilibrium fields to form islands for divertors. Bootstrap currents can change the size and location of scrape off layer islands potentially damaging plasma facing components. Protection of these components critical for achieving high performance operation requires understanding the underlying equilibrium. From an initial VMEC equilibrium, SIESTA allows for a radial component of the magnetic field and breaking the nested surfaces opening island and stochastic regions. Previously, SIESTA equilibria were limited to the bounds of the VMEC equilibrium. A new free boundary implementation extends the computational domain beyond the VMEC last closed flux surface allowing the modeling of islands in the scrape off layer.

<sup>1</sup>Work supported by US DOE under Contract DE-AC05-00OR22725 with UT-Battelle, LLC.

Mark Cianciosa  
Oak Ridge National Laboratory

Date submitted: 03 Jul 2019

Electronic form version 1.4