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Modifications to the shear Alfvén continua due to the presence of a magnetic island[1] C.R. COOK, University of Wisconsin, S.P. HIRSHMAN, D.A. SPONG, Oak Ridge National Laboratory, C.C. HEGNA, D.T. ANDERSON, University of Wisconsin, R. SANCHEZ, Universidad Carlos III de Madrid — Most studies of the shear Alfvén spectrum of toroidal confinement devices assume the existence of topologically toroidal magnetic surfaces. In this work, we will address how the presence of a magnetic island alters these calculations. In particular, the analytic theory of gaps induced by an island in the Alfvén continua of a cylindrical plasma will be presented. This calculation will be compared to the well-known results for the toroidicity-induced Alfvén eigenmode gap. This theory utilizes island straight field-line coordinates, which will be detailed. Early and planned work will be discussed regarding the use of SIESTA along with STELLGAP to analyze the effects of islands and quasi-single-helicity states on the Alfvén continua in RFPs. SIESTA is a 3D MHD equilibrium code capable of resolving islands. The Hessian matrix computed in SIESTA can be used to solve the MHD eigenmode equations, allowing the Alfvén continua to be determined in the presence of islands. STELLGAP is a code that computes the Alfvén spectrum from a toroidal VMEC equilibrium converted to Boozer coordinates through the BoozXform code. Comparing the continua from the STELLGAP case without islands to the SIESTA case with islands will allow us to verify the presented theory in the future.

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