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Localized momentum sources in a transport code as a model for biased-rings in a Helicon plasma[1] T. MARINE, M. BREYFOGLE, A.S. WARE, University of Montana, M. GILMORE, C. WATTS, University of New Mexico, E. SCHUSTER, Lehigh University — In the HELCAT experiment, biased concentric rings are used as control elements for the radial electric field profile. By varying the bias voltages, the local $\mathbf{E}\times\mathbf{B}$ flow can be modified. Here, we investigate modeling the biased rings as localized momentum sources in a 1-D transport code. The effect will be identical to a source of $\mathbf{E}\times\mathbf{B}$ flow in the limit of zero β (i.e., when diamagnetic flows are negligible). By varying the momentum sources a sheared radial electric field can be generated that can suppress turbulent particle and heat transport. The results of modeling typical HELCAT experimental equilibria will be presented along with an investigation of the density dependence of ion-electron thermal coupling. We will also test the impact of different numerical models for the momentum sources and compare the results with experimental measurements of the radial electric field in the HELCAT experiment.

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