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MHD-based Modeling of Coaxial Helicity Injection (CHI) in HIT-II[1] C.R. SOVINEC, E.C. HOWELL, A.J. REDD, Univ. of Wisconsin-Madison — Results from the Helicity Injected Torus-II experiment at the Univ. of Washington distinguish CHI operational regimes for STs with weak and strong levels of magnetic relaxation [Redd, et al., PoP 14, 112511 (2007) and PoP 15, 22506 (2008)]. Numerical time-dependent computation with a simplified zero-β resistive-MHD model reproduce the scalings associated with sheet-current equilibria [Bayliss, et al., PoP submitted] in weakly relaxing conditions. The comparisons of laboratory and numerical results from this study are reviewed here, together with a dimensional analysis for ST CHI based on the Grad-Shafranov equation. New computational results for conditions with larger ratios of injected and toroidal-field current are also presented. Symmetry-breaking MHD instabilities relax the current profile and amplify the poloidal flux relative to the vacuum injector flux. The influence of temperature evolution and temperature-dependent transport coefficients is described.

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Carl Sovinec
Univ. of Wisconsin-Madison

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