Simulation and experiment investigating neoclassical effects of impurities on bootstrap current in HSX[1] J. SMONIEWSKI, J. TALMADGE, HSX Plasma Lab, University of Wisconsin, M. LANDREMAN, University of Maryland — Impurity accumulation is a major concern for stellarators, and HSX provides a chance to understand impurity dynamics in a low-shear quasi-symmetric device. Calculations with SFINCS have shown that small changes in Z_{eff} impact the bootstrap current in W7-X.[2] The PENTA and SFINCS codes are in use at HSX and can solve the drift-kinetic equation with multiple plasma species. PENTA is a momentum conserving extension of the DKES code, which calculates the monoenergetic transport matrix on a flux surface using a moments approach. SFINCS is a four dimensional drift-kinetic continuum code. We compare calculations with PENTA and SFINCS for HSX plasmas with varying impurities, focusing on effects on the bootstrap current. Experimental measurements of the bootstrap current using a Rogowski coil are compared to simulation results where possible.

[2]A. Mollén et al, J. Phys.: Conf. Ser., 561, 012012, 2014.

Jason Smoniewski
HSX Plasma Lab, University of Wisconsin