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Internal and external characterization of reconnection in SSX C.D. COTHRAN[1], M.R. BROWN, T. GRAY, Swarthmore College, M.J. SCHAFFER, GA, E.V. BELOVA, PPPL — The internal and external properties of the reconnection process responsible for the merging of left- and right-handed spheromaks in the SSX device is analyzed using data from a variety of diagnostic instruments. Time resolved magnetic probe data permit the determination of the external field strength, an estimate of the external ideal inflow velocity, as well as the reconnection electric field from the rate of change of poloidal flux. At the internal scale, the outflow speed is known from time resolved spectroscopy of Doppler shifted line emission from carbon impurity ions; combined with interferometer density measurements and assuming Alfvenic outflow, the internal inflow (at the entrance to the reconnection layer) magnetic field and velocity is inferred. The aspect ratio of the layer is thus determined, and the length is found to be only a factor of 3 to 4 times the width. Purely 2D scaling based on ideal MHD to relate the external and internal structure does not seem to work, so numerical simulation accounting for the toroidal geometry seems necessary.

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