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Characterization of Disruption Halo Currents in NSTX[1] S.P. GERHARDT, J. BRESLAU, E. FREDRICKSON, S. JARDIN, R. KAITA, J. MANICKAM, J. MENARD, PPPL, S. SABBAGH, Columbia University, F. SCOTTI, H. TAKAHASHI, PPPL, A.H. BOOZER, Columbia Universtiy — Since 2007, an ever-expanding set of disruption halo current diagnostics has been installed in NSTX. These sensors include partial rogowski coils wrapped around the center column, discrete toroidal field detectors, tiles instrumented with resistive shunts, and small rogowski sensors on the PFC supports. Halo current fractions greater than 30% have been measured, with the largest currents often coming from Ohmic and L-mode vertically unstable disruptions. The largest halo currents are often associated with large plasma current quench rates. Halo currents are sometimes observed to flow when q_edge>3, but a rapid increase in the amplitude occurs when q_edge drops below 2. These halo currents can have a significant toroidal asymmetry, and this asymmetry is observed to rotate toroidally. Up to 7 toroidal transits have been observed in rare cases, with 2-3 revolutions fairly common. The toroidal rotation frequencies are typically 0.5-2 kHz, though the rotation tends to be non-steady, often with a low rotation phase followed by a period of rapid rotation. The rotation frequency tends to be anti-correlated with the halo current fraction. The non-axisymmetric part of the halo current typically decays before the n=0 part, and filament modeling of the plasma indicates that the loss of the non-axiymmetric current corresponds to the time when the last closed magnetic surface vanishes.

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