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Ion Heating in Pulsed Helicon Sources EARL SCIME, RICHARD MAGEE, JERRY CARR JR., MATTHEW GALANTE, GREG LUSK, DUSTIN MCCARREN, ERIC REYNOLDS, STEPHANIE SEARS, ROBERT VANDERVORT, West Virginia University, ROBERT HARDIN, ORNL — Previous measurements demonstrated a strong correlation between ion temperature and the ratio of the antenna frequency to the local lower hybrid frequency. When strong ion heating occurs, the ion temperature profile in steady-state helicon sources is flat or peaked at the edge; suggesting an edge localized ion heating mechanism. The same parameters that yield the largest ion temperatures are also predicted to have the strongest damping of slow waves in the edge. Here we present observations that further support the conclusion that short wavelength slow waves parametrically decay into electrostatic modes and also directly heat ions. Collective Thomson scattering measurements indicate significant wave power at frequencies of $f \sim 100$ kHz and perpendicular wave numbers of ~ 89 rad/cm. The waves are localized to the same region as lower frequency ion acoustic waves are observed with probes. By pulsing the helicon source and observing the time evolution of the ion temperature profile, we find that the ion temperature profile flattens out and then becomes hollow at the same time the parametrically driven ion acoustic waves appear.

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