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Experiments with HHFW on NSTX[1] J.R. WILSON, R. BELL, S. BERNABEI, J.C. HOSEA, C. KESSEL, B. LEBLANC, J. MENARD, C.K. PHILLIPS, PPPL, P.M. RYAN, D.W. SWAIN, J. WILGEN, ORNL — Experiments on NSTX utilizing HHFW have concentrated on those elucidating the conditions required for effective HHFW heating and current drive and those utilizing HHFW for solenoidal free start-up and discharge sustainment. Past experiments have established that power absorption depends on antenna phasing. Decreased heating efficiency and increased edge ion heating are observed as the fast wave toroidal wave-number decreases. Differences in absorption are seen for waves excited in the co-current and counter-current toroidal direction. These differences will be explored by reversing the direction of the magnetic fields to differentiate between geometric and plasma physics effects. Edge ion heating due to parametric decay is further explored by direct digitization of an edge probe signal and an edge microwave reflectometer signal. The reflectometer signal should allow better spatial localization of the decay waves. HHFW has been used for solenoidal-free startup experiments where the rf power is used to breakdown and sustain a plasma that than has toroidal current induced by the outboard poloidal field windings. To date, the most effective plasma production is with the antenna phased for the longest waveguide excitation. In experiments with loop voltage clamping, HHFW in conjunction with NBI can extend the current duration.

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