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HHFW Propagation and Damping Properties on NSTX versus B_Φ and Antenna $k_{||}$[1] J. HOSEA, R. BELL, S. BERNABEI, B. LEBLANC, C.K. PHILLIPS, J.R. WILSON, PPPL, S. SABBAGH, Columbia U., L. DELGADO-APARICIO, K. TRITZ, JHU, P. RYAN, J. WILGEN, ORNL — HHFW RF power delivered to the core plasma of NSTX is strongly reduced as the launched wavelength is increased – for B_Φ = 4.5 kG, heating is $\sim$ 1/2 as effective for $k_{||}$ at -7m^{-1} as at 14m^{-1} and $\sim$ 1/10 as effective at -3m^{-1}. Measured edge ion heating, attributable to parametric decay (PDI), increases with wavelength as well but does not increase fast enough to account for the observed power loss. Surface fast waves (FW) may enhance both PDI and also losses in sheaths and structures around the machine – FW fields propagate closer to the wall with decreasing B_Φ and $k_{||}$ ($n_{onset} \propto B_\Phi * k_{||}^2$). Experiments at several $k_{||}$ and B_Φ values suggest strong propagating FW effects on heating. A dramatic increase in core heating was observed at -7m^{-1} when B_Φ was increased to 5.5 kG – central Te near 4 keV at P_{RF} = 2 MW – and reduced core heating was observed at B_Φ= 3 kG. Also, the far-field RF poloidal magnetic field increased a factor of $\sim$ 3 when $k_{||}$ was reduced from 14m^{-1} to -3m^{-1}, suggesting a large increase in wall/sheath power loss. The results of these experiments and their implications for the role of surface wave losses will be discussed.

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