

Preliminary ECH pre-ionization and EBW coupling experiments on NSTX

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A 30 kW 18 GHz ECH system has been installed on NSTX to provide plasma pre-ionization and will also be used to conduct electron Bernstein wave (EBW) coupling experiments for $n_{||}=0$ launch. This system consists of two klystrons with separate waveguide transmission systems and corrugated horn launchers. The launch polarization is linear and can be adjusted to any plane by installing waveguide twists. The horns generate a launch beamwidth of $\sim 24^\circ$ and are aimed at the NSTX centerline from an above axis port. The launch beam crosses both fundamental and second harmonic resonances so strong first pass absorption can be obtained with either O or X mode launch during the plasma startup process. The launcher horns point inline with the plasma edge density gradient. By studying wave reflections from the plasma during high density (above cutoff) portions of the discharge, it should be possible to determine the optimum density gradient conditions for direct coupling to the EBW wave for the $n_{||}=0$ case. Edge density information is expected to be available from the ORNL reflectometer system located nearby. Both pre-ionization and EBW coupling studies are planned for the early phase of NSTX operation.