

# High Harmonic Fast Wave Operation on NSTX\*

P. M. Ryan<sup>1</sup>, J. R. Wilson<sup>2</sup>, D. W. Swain<sup>1</sup>, R. I. Pinsky<sup>3</sup>, M. D. Carter<sup>1</sup>, D. Gates<sup>2</sup>, J. C. Hosea<sup>2</sup>, J. E. Menard<sup>2</sup>, D. Mueller<sup>2</sup>, S. A. Sabbagh<sup>4</sup>, J. B. Wilgen<sup>1</sup>

<sup>1</sup> Oak Ridge National Laboratory, Oak Ridge, TN, USA 37831-8071

<sup>2</sup> Princeton Plasma Physics Laboratory, Princeton, NJ, USA 08543

<sup>3</sup> General Atomics, La Jolla, CA, USA 92121

<sup>4</sup> Columbia University, New York, NY, USA

A high harmonic fast wave (HHFW) antenna array, designed to provide up to 6 MW of power at 30 MHz for heating and current drive applications, has been operated on the NSTX experiment at Princeton Plasma Physics Laboratory (PPPL). Initial rf operation used eight straps to form four resonant loops, which were driven by two transmitters. Two adjacent loops were connected with a half-wavelength coax section and hence were driven out of phase by a single transmitter. The decoupler network was not used at this time. Up to 2 MW of power was delivered during this stage of operation; inter-loop phasings of  $0- -0$  and  $0- -0-$  were investigated. Models of the power distribution system indicate the nominal plasma loading was about 5 /m, close to the design value of 6 /m. Theoretical calculations of fast wave loading, based on edge density profiles obtained with a microwave reflectometer, are in general agreement with these measurements. A reduction in the strap inductance of up to 15% has been observed as the plasma position changes during the pulse.

The HHFW system has since been re-configured for full 12-strap, 6-transmitter operation and will use the decoupler network to isolate adjacent loops. The goal is to increase the power delivered to the plasma to the 6 MW level. Early results of this effort will be presented.

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