

Abstract Submitted
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Synergy in Two-Frequency Fast Wave Cyclotron Harmonic Absorption in DIII-D¹ R.I. PINSKER, M. CHOI, General Atomics, M. PORKOLAB, MIT, W.W. HEIDBRINK, Y. ZHU, UC-Irvine, F.W. BAITY, ORNL, J.C. HOSEA, PPPL — Fast waves (FWs) at 60 MHz and at 90 MHz are coupled to DIII-D discharges for central heating and current drive at net FW power levels up to 3.5 MW. In 2 T discharges with fast deuteron populations from neutral beam injection, 4th and 6th deuterium cyclotron harmonic absorption on the fast ions competes with direct electron damping and with edge losses. If the fast deuterons are accelerated by absorption of 60 MHz (4th harmonic) FWs, adding 90 MHz power (6th harmonic) increases the fusion neutron rate by an increment larger than the sum of the increments observed with separate 90 MHz and 60 MHz pulses (synergy). Synergy in the global confinement is also observed. The regions of velocity space that are affected with the two-frequency FW heating are studied with fast-ion D_α spectroscopy and by detailed characterization of the dynamics of the neutron rate with modulated neutral beams.

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Bob Pinsker
General Atomics

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