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Application of Fast Wave Current Drive to Discharges with Negative Central Shear,¹ C.B. FOREST, S.C. CHIU, J.S. DEGRASSIE, H. IKEZI, C.C. PETTY, R.I. PINSKER, R. PRATER, General Atomics, D.B. BATCHELOR, F.W. BAITY, E.F. JAEGER, M. MURAKAMI, Oak Ridge National Laboratory, J.H. LEE, University of California, Los Angeles, M. PORKOLAB, Massachusetts Institute of Technology — The high performance of NCS discharges motivates development of noninductive means, such as fast wave current drive, to help sustain the NCS profiles. NCS discharges make excellent targets for FWCD since the density is low, $2 \times 10^{19} \text{ m}^{-3}$, and the electron temperature is high, typically 5 keV. Electron temperatures as high as 8 keV have been obtained with 2 MW of FW power plus 3.7 MW of neutral beam power. The total plasma current driven by counter-FWCD is up to 300 kA, and the current density from FWCD exceeds the net current density on axis by a factor 3. Counter-FWCD maintains the NCS configuration for 0.5 s longer than co-FWCD. A mode of improved confinement spontaneously appears during counter-FWCD when the power is sufficiently high. This mode is characterized by decreased electron heat diffusivity as well as ion heat diffusivity and particle transport.

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