

ABSTRACT

The electron cyclotron heating and current drive complex on the DIII-D tokamak presently comprises six gyrotrons injecting rf power from the low field side at 110 GHz, the $2f_{ce}$ resonance at the center of the vacuum chamber. Typical injected rf power is 600–650 kW per gyrotron. The launched rf can be directed over $\pm 20^\circ$ toroidally to create both co- and counter-current drive and scanned over 40° poloidally to permit the injected rf beams to intersect, and be absorbed at, the second harmonic resonance anywhere in the tokamak upper half plane. The elliptical polarization is controlled so that the desired extraordinary or ordinary modes are excited for any injection geometry. The maximum injected energy on a single plasma shot has been 16.6 MJ for six gyrotrons injecting a total of 3.4 MW for 5 seconds.