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High Power Operation of Tunerless Fast Wave Current Drive Antenna Systems on DIII-D¹ R.I. PINSKER, D.A. PHELPS, R.W. CALLIS, W.P. CARY, J.S. DEGRASSIE, C.P. MOELLER, R.C. O'NEILL, C.C. PETTY, General Atomics, F.W. BAITY, Oak Ridge National Laboratory — Several different types of fast wave current drive (FWCD) systems that present a constant load impedance to the rf generator despite time-varying antenna impedance have recently been developed at DIII-D. These designs also minimize the number of variable impedance matching elements to improve their reliability and ease of operation at high power levels. Two of these designs are being implemented on the FWCD systems at DIII-D this year. The “split” system, which is essentially a tunerless version of the previous DIII-D system, has been used on one of the three four-element phased array antennas since spring, 1997. Experiments to date have shown a standing wave ratio < 1.25 at the generator output during operation into ELMing H-modes plasmas, during which the resistive antenna loading varies by about a factor of 3 on a millisecond time scale. A traveling wave type of system is being built for installation on another of the antenna arrays in summer, 1997. Details of these two systems and further results from high power operation will be presented.

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