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Recent Results using a 28 GHz EBW Heating and Current Drive System on MAST[1] TIM BIGELOW, JOHN CAUGHMAN, MARTIN PENG, STEPHANIE DIEM, Oak Ridge National Laboratory, JULIAN HAWES, CHRIS GURL, JONATHAN GRIFFITHS, VLADIMIR SHEVCHENKO, PAUL FINBURG, JOELLE MAILLOUX, Culham Center for Fusion Energy, GARY TAYLOR, Princeton Plasma Physics Laboratory — Improvements to a high power 28 GHz gyrotron system have been made to the MAST Electron Bernstein Wave (EBW) heating, start up, and current drive system in the past few years as collaborative research between ORNL and CCFE. Recent EBW heating and CD experiments on MAST have improved upon previous RF generated plasma current levels. The goals of the research were to extend the initial EBW CD study [1] by increasing substantially the power level and pulse length of the gyrotron hardware and improve transmission line efficiency used in initial experiments. A dummy-load power level of up to 200 kW and a pulse length approaching 0.5 s has been achieved. Arcing, localized to the launcher box, has been observed to limit the launched power level to ∼80 kW for up to 450 ms. Several days of high power plasma operation have been recently completed with good progress in increasing the previously attainable solenoid-free plasma current levels. Up to 75 kA of plasma current was achieved at this injected power level.

[1] V. Shevchenko, et al, Nucl. Fusion **50** (2010), 022004.

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