Abstract Submitted
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High Efficiency push-pull class E amplifiers for fusion rocket engines[1] GABRIEL GAITAN, ERIC HAM , Princeton Univ, S.A. COHEN , CHARLES SWANSON, PPPL, MINJIE CHEN , Princeton Univ, CHRISTOPHER BRUNKHORST, PPPL — In a Field Reversed Configuration fusion reactor, ions in the plasma are heated by an antenna operating at RF frequencies. This paper presents how push-pull class E amplifiers can be used to efficiently drive this antenna in the MHz range, from 0.5MHz to 4 MHz, while maintaining low harmonic content in the output signal. We offer four different configurations that present a trade-off between efficiency and low harmonic content. The paper presents theoretical values and breadboard results from these configurations, which operate at a power of around 100W. For a practical design, multiple amplifiers would be linked in parallel and would power the RF antenna at around 1MW. These designs provide multiple different options for reactor systems that could be used in a variety of applications, from power plants on the ground to rocket engines in space.

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Gabriel Gaitan
Princeton Univ

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