

Abstract Submitted  
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**The Development of SiC MOSFET-based Switching Power Amplifiers for Fusion Science**<sup>1</sup> JAMES PRAGER, TIMOTHY ZIEMBA, KENNETH MILLER, JULIAN PICARD, Eagle Harbor Technologies, Inc. — Eagle Harbor Technologies (EHT), Inc. is developing a switching power amplifier (SPA) based on silicon carbide (SiC) metal-oxide-semiconductor field-effect transistor (MOSFET). SiC MOSFETs offer many advantages over IGBTs including lower drive energy requirements, lower conduction and switching losses, and higher switching frequency capabilities. When comparing SiC and traditional silicon-based MOSFETs, SiC MOSFETs provide higher current carrying capability allowing for smaller package weights and sizes and lower operating temperature. EHT has conducted single device testing that directly compares the capabilities of SiC MOSFETs and IGBTs to demonstrate the utility of SiC MOSFETs for fusion science applications. These devices have been built into a SPA that can drive resistive loads and resonant tank loads at 800 V, 4.25 kA at pulse repetition frequencies up to 1 MHz. During the Phase II program, EHT will finalize the design of the SPA. In Year 2, EHT will replace the SPAs used in the HIT-SI lab at the University of Washington to allow for operation over 100 kHz. SPA prototype results will be presented.

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