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Silicon Carbide (SiC) MOSFET-based Full-Bridge for Fusion Science Applications[1] TIMOTHY ZIEMBA, KENNETH MILLER, JAMES PRAGER, JULIAN PICARD, AKEL HASHIM, Eagle Harbor Technologies — Switching power amplifiers (SPAs) have a wide variety of applications within the fusion science community, including feedback and control systems for dynamic plasma stabilization in tokamaks, inductive and arc plasma sources, Radio Frequency (RF) helicity and flux injection, RF plasma heating and current drive schemes, ion beam generation, and RF pre-ionizer systems. 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. Eagle Harbor Technologies (EHT) is designing, constructing, and testing a SiC MOSFET-based full-bridge SPA. EHT will leverage the proprietary gate drive technology previously developed with the support of a DOE SBIR, which will enable fast, efficient switching in a small form factor. The primary goal is to develop a SiC MOSFET-based SPA for fusion science applications.

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