

Abstract Submitted
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ICRF Heating for SPARC¹ JOHN WRIGHT, YIJUN LIN, STEPHEN WUKITCH, ANDREW SELTZMAN, Massachusetts Institute of Technology, SPARC TEAM — SPARC is designed to have a 30 MW coupled ICRF system as its sole proposed auxiliary heating method. SPARC RF scenarios are based on the successes of Alcator C-Mod as well as the TFTR and JET programs during their D-T operation. Among heating methods, ICRF is the only proven method that can effectively heat high density and high field plasmas in SPARC for both the pre-D-T and D-T operations. The single-pass-absorption for D-T burning plasma combining 2nd harmonic T heating and minority ³He heating will be > 50% under most conditions. Optimal k_{\parallel} spectra for performance will be determined and incorporated detailed simulation results using TORIC and AORSA/CQL3D will be presented. These simulations will determine the power partition among species as the tail T and ³He ions slow down. In addition to operation at 120 MHz, we will discuss the possibility of 3-species scenario operation at a lower 80 MHz operation. Optimum fusion yield occurs for beam on target temperatures of 110 keV. This suggests tuning of ICRF scenarios to create tail energies for fuel ions in this range can be used to maximize the D-T burn rate. We will discuss possible scenarios for this as well as characterizing the general increase of the fusion rate in an ICRF heated plasma over the thermal D-T rate.

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