Abstract Submitted
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Conceptual Design for the ICRF Antennas and Transmission Lines for SPARC[1] YIJUN LIN, S.J. WUKITCH, Massachusetts Institute of Technology MIT — ICRF will be the sole auxiliary heating method on SPARC to provide up to 25 MW heating power. A total of 12 field-aligned 4-strap antennas in 6 ports has been selected as the first option while 3-strap antennas are the backup antenna option. The $k_{||}$ of the launched fast wave peaks at ˜17.5 m^{-1} for both good core wave absorption and edge coupling. The analysis behind the antenna decision will be presented, including physics analysis on the expected core absorption, edge coupling and impurity control and preliminary engineering analysis for power and voltage handling. The transmission lines and the matching network need to operate under a large range of antenna load for different plasma regime. They also need to maintain matching during periods of rapid load variation during L-H transitions and ELMs. Several methods will be analyzed: fixed-length triple-stub, frequency feedback and external conjugate T. By combining these methods, RF power reflection coefficient $\leq 11\%$ (VSWR ≤ 2) can be achieved and maintained for all SPARC plasmas.

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Yijun Lin
Massachusetts Institute of Technology MIT

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