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Conversion of electrostatic Bernstein waves in the SCR-1 Stellarator using a full wave code

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The small modular SCR-1 Stellarator (R = 247.7 mm, R/a = 6.2, ια = 0.264) has an ECRH system of 2.45 GHz (5 kW) with an average magnetic field of 41.99 mT [1]. Few studies on conversion of electrostatic Bernstein waves under these conditions have been performed in Stellarators [2,3]. This work presents the results of converting electrostatic Bernstein waves in the SCR-1 Stellarator using the full wave code IPF-FDMC [3], taking the 3D magnetic field obtained by VMEC code as input and the experimental electron density profile obtained using a Langmuir probe. New microwave heating scenarios that take the SCR-1's vacuum vessel into account in order to improve the O-X conversion due to reflection of the incoming radiation from the ECRH system are presented. The percentage of single pass O-X mode conversion is around 3%. The design of an antenna with its characteristics and locations according to the SCR-1 viewports is explained. Other important aspects of this work are focused on the BS-SOLCTRA (Biot-Savart Solver for Compute and Trace Magnetic Fields) code, developed by our research group, and its way to convert it into a parallel and high-performance computing platform. This code allows calculations of the 3D vacuum magnetic field and the visualization of the magnetic flux surfaces at SCR-1. Similarly, the results of the comparison of the flux surfaces measured with an electron beam and different kinds of fluorescent rods with computed flux surfaces by means of the BS-SOLCTRA code are shown. Finally, magnetic and energy diagnostics have been developed with special requirements based on the SCR-1 geometry so the design, data analysis tools and measurement technique are introduced.

References
[1] V I Vargas et al 2015 J. Phys.: Conf. Ser. 591 012016.
[2] R. Ikeda et al, Physics of Plasmas, 15, 7, (2008).
[3] A. Köhn et al, Plasma Physics and Controlled Fusion 55, 1 (2013).

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