

High dielectric dummy loads for ITER ICRH antenna laboratory testing: numerical simulation of one triplet loading by ferroelectric ceramics.

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Up to now, classical “water” loads have been used for low power testing of ITER ICRH prototype or mock-up antennas. A fair description of the antenna frequency response is obtained excepted for the phasing ($0 \pi 0 \pi$). High dielectric loads are requested to improve the antenna response in the low frequency band [1]. In view of laboratory testing, dummy loads are also required to have efficient wave spatial attenuation to avoid standing waves and to minimize load volume. In this paper, barium titanate ceramic powders mixed with water are shown to exhibit very attractive electromagnetic properties. Coupling performance of one triplet of the ITER ICRH antenna to such kind of loads is numerically investigated. The radiated wave attenuation into the load is also characterized. In spite of its frequency dispersion, “barium titanate” loads are shown to allow the characterization of the full scale triplet frequency response on a scaled-down mock-up.

[1] A. Messiaen, et al. Fusion Eng. Des. (2011),
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