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RF Power to Plasma Increase Using EBG Surfaces in IC and LH Antennas SAUL GUADAMUZ, RICCARDO MAGGIORA, Politecnico di Torino, Italy — High impedance surfaces or electromagnetic band gap (EBG) surfaces have proved themselves to be useful in wireless communications applications due to their unique characteristics such as no propagating surface wave support, no conduction of RF current for a given bandwidth, in-phase electromagnetic reflection and non-inverted image of the electric charge in front of them [1]. These characteristics make possible to design compact antennas achieving better performance in terms of radiation and input impedance. ICRF and LH antennas in plasma experiments can take advantage of using EBG surfaces. One of the main issues in ICRF plasma heating is the high mismatch between the feeding lines and the antenna inputs. The adoption of EBG surfaces in the ICRF antenna structure and the advantages offered by a predictive designing tool as TOPICA [2] offer the possibility to improve significantly the coupled power to plasma. The adoption of EBG surfaces in the LH waveguides permits to reduce the major dimension of waveguides not affecting the propagation. It is then possible to manufacture compact LH arrays of waveguides.

[1] IEEE Trans. Microwave Theory Tech., vol. **47**, pp. 2059–2074, Nov. 1999.
[2] Nucl. Fusion, **46** (2006) S476.

Riccardo Maggiora
Politecnico di Torino, Italy

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