

Mechanical design proposal of an Ion Cyclotron Resonant Heating antenna for ITER

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The Controlled Fusion Research department from CEA Cadarache has proposed an ICRH antenna mechanical design for ITER. It is based on the resonant double loop concept with conjugate T matching to make the circuit resilient to strong plasma load variations as ELMs. The antenna is constituted of two main parts; the in-vessel launcher which is inside the primary torus vacuum and the Compact Vacuum Tuners (CVT) that is located after the first barrier in a private vacuum. This CVT allows to match, at the strap location, the antenna impedance with the plasma load, on the frequency range from 45 to 55 MHz. It has the particularity, for repair and maintenance, to be easily removable from the back without breaking the primary vacuum. Apart from the Faradays screens fit to shape the plasma edge, the in-vessel launcher and CVT are made out of 6 modules, all identical, to allow the best economical approach for the manufacture, the assembly and the maintenance of the antenna.

This paper will describe the work that has been conducted by the Euratom-CEA Association in collaboration with the ENEA-Frascati and the ENEA-Consortio RFX under EFDA contracts. The technical solutions adopted for a realistic manufacture and assembly of the proposed ICRH antenna, will be fully detailed in the article.