

## **ENGINEERING PRINCIPLES FOR STRUCTURAL COMPONENTS OF EC HEATING AND CURRENT DRIVE SYSTEMS**

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Beside the complex requirements on the physics side of an EC heating system for a fusion device, also the need for a functionally linked structural system to accommodate the sensitive millimeter-wave components is essential. The development of the ITER EC H&CD upper launcher during the last ten years has shown that the design work shall not be performed as stand-alone actions on specific tasks but rather on an integral basis, where the specific peculiarities for the physics performance, the integrity of the systems outer structure and for assembly, maintenance and repair will be considered in parallel.

The structural design of an EC heating system must provide mechanical strength, sufficient heat removal and adequate nuclear shielding capability. Also assembly strategies, tolerances, inspectability, qualification and Remote Handling capability shall be taken into account. All of these design aspects are influenced by the design of the millimeter wave components, why laying out these in accordance with the structural requirements can resolve integration issues in an early stage of the design work in order to minimize cost and optimize project scheduling.

This contribution gives an outline of the basic principles of mechanical engineering for structural components to raise the awareness of incorporating design aspects from different point of views.

Potential collaborations:

With JAEA: design development of common features for the equatorial port and the upper port.

With ITER US: Integration of the Ex-Vessel waveguides / transmission line.