STATUS AND FUNCTIONAL CAPABILITIES OF ITER EC H&CD SYSTEM

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A 24MW CW Electron Cyclotron Heating and Current Drive (EC H&CD) system operating at 170GHz is to be installed for the ITER tokamak. The EC system will represent a large step forward in the use of microwave systems for plasma heating for fusion applications; present day systems are operating in relatively short pulses (≤10s) and installed power levels of ≤4.5MW.

The magnitude of the ITER system necessitates a worldwide collaboration. This is reflected in the international partnership formed between Europe, India, Japan, Russia, United States and the ITER organization to collaborate on design and R&D activities leading to the procurement, installation, commissioning and operation of this system. The EC system is comprised of 12 installed power supplies, up to 24 installed sources, 24 transmission lines, one equatorial launcher and four upper launchers.

The whole system is close to completion of its preliminary design phase that will end with a formal and independent review to be held in September 2012. The design maturity of all sub-systems is already at preliminary level or above. At this stage of design development there are still some technical challenges that have to be faced and consequently a number of modifications are under study, with the goal to either improve functionalities and/or simplify the system for higher reliability. Among the others, modifications under consideration include: changing the equatorial launcher from toroidal to poloidal for higher current drive efficiency, renegotiation of procurement sharing for diamond windows (using a single supplier for design simplification and increased standardization), removal of Be coating from plasma exposed launchers surfaces following increased plug recession.

A description of the actual system design and of its functional capabilities will be discussed. An overview of the envisioned schedule and strategy for procuring and installing the system will be presented.