

Development of ECH system components in JAEA

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Development of a 170GHz gyrotron, a transmission line and an ITER equatorial launcher (antenna) has been carried out in JAEA. As the recent modification for the gyrotron, the design of a built-in mode converter and a magnetron injection gun (MIG) were changed. In the experiments, a pre-programming control of the cathode heater power were applied so that beam current was stable. In addition, the new operation regime has been developed. Consequently, the operation of 1MW-800sec with total efficiency of 55% was performed. In addition, the operation of 0.6MW-3600sec with efficiency of 45% was also demonstrated. The performance of this gyrotron satisfies the requirement of the ITER gyrotron. High power experiment of the ITER relevant transmission line (inner diameter of 63.5mm, ~40m corrugated waveguides, 6 miter bends, a switch, a gate valve and a dummy load) was carried out and transmission efficiency of 96% was attained. This result is promising that the high efficient transmission will be accomplished in ITER. The design of the ITER equatorial EC launcher and the development of the launcher components have been carried out. The launcher consists of a front shield and a port plug that movable mirrors, transmission lines, internal shields and so on are installed. Lately, we are at work on the design modification of the transmission line in the launcher to increase the reliability respect to with the fabrication and refurbishment. The modification will be presented. The activities on the R&D of the launcher components such as trial fabrication of a steering mirror and development of a steering mechanism for the mirror are also introduced.