

A Feasibility Study of Load Resilient Antenna for KSTAR ICRF Heating

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The effective rf power coupling for ELMy plasmas is one of the key issues on ICRF heating. The conjugate T matching, which was adopted by ITER design, is known to be one of effective solutions to this problem. The KSTAR ICRF antenna consists of 4 current straps having the transmission line configurations of resonant loops. The conjugate T matching concept is applied to each strap by conjugating the impedance of the upper and the lower parts of the resonant loops at the T point and the electrical lengths of the upper and the lower parts are adjusted by using the two phase shifters. In this work, the feasibility of the conjugate T matching is studied for the KSTAR ICRF antenna. With the mutual coupling of 20 % between the upper and the lower current straps, the KSTAR antenna shows the load resilient characteristics against the variation of the plasma loading resistance. In addition, the effects of the phase difference of the antenna current between the upper and the lower straps on the rf power coupling to plasmas are investigated using the full wave simulation code TORIC.