

Abstract Submitted
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Development of active stub tuning networks in the Lower Hybrid Range of Frequencies¹ G.M. WALLACE, E. FITZGERALD, D.K. JOHNSON, A.D. KANOJIA, P. KOERT, Y. LIN, R. MURRAY, S. SHIRAIWA, D.R. TERRY, S.J. WUKITCH, MIT PSFC, J. HILLAIRET, CEA-IRFM — Active stub tuning with a fast ferrite tuner (FFT) allows for the RF matching network to respond dynamically to changes in the plasma impedance such as during edge density fluctuations or the L-H transition, and has greatly increased the effectiveness of fusion ion cyclotron range of frequency systems. A high power waveguide double-stub tuner is under development for use with the Alcator C-Mod lower hybrid current drive (LHCD) system at 4.6 GHz. Construction and test-stand performance of the high power stub tuner will be discussed. Cross-coupling of reflected power between columns must be considered when evaluating the performance of a matching network for a LHCD phased array launcher. The problem is simulated by cascading a scattering matrix for the plasma provided by a linear coupling model with the measured launcher scattering matrix and that of the FFTs. The solution for the stub lengths is advanced in an iterative manner to simulate the time-dependent behavior of the real system under conditions of time-varying plasma load conditions. System performance is presented for a range of edge density conditions from under-dense to over-dense and a range of launched $n_{||}$.

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