Design of an Eight-Channel Doppler Backscattering System for use on the EAST Tokamak

E.J. DOYLE, W.A. PEEBLES, X. NGUYEN, T.L. RHODES, G. WANG, C. WANNBERG, Physics Dept. and PSTI, UCLA, H. LI, A.D. LIU, C. ZHOU, C.X. YU, Dept. of Modern Physics, University of Science and Technology of China — Doppler backscattering (DBS) is a powerful millimeter-wave plasma diagnostic used in tokamaks and other magnetic confinement devices to measure turbulence characteristics [1]. DBS systems measure the laboratory frame propagation velocity of intermediate wavenumber density fluctuations, and also monitor fluctuation amplitudes and frequency spectra, with high spatial resolution (cm level). A DBS system has been designed and is under construction for use on the EAST superconducting tokamak, located in Hefei, China. The new system will provide eight simultaneous fixed-frequency Doppler channels, spanning the V-band (50-75 GHz) frequency range, i.e. the system will provide eight spatially localized measurement locations. The microwave source design for the EAST system is a modified version that used for the eight channel DBS system on the DIII-D tokamak [2]. Details of the modified microwave system design and measured performance characteristics will be presented, along with a design for the microwave interface system for EAST.


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