

DIAGNOSTICS OF HIGH TEMPERATURE PLASMAS ALPHA PARTICLE DIAGNOSTIC DEVELOPMENT

R. K. Richards,¹ D. P. Hutchinson,¹ C. A. Bennett,¹ and C. H. Ma

Research towards developing a diagnostic for the measurement of confined high energy alpha particles in a burning fusion reactor has continued. Work in this program includes an investigation of implementing a collective Thomson scattering diagnostic system on the JT-60U tokamak for the purpose of fast ion measurement. Visits were made to the JT-60U site for the purpose of developing such a system. A high power pulsed CO₂ laser has been constructed and a heterodyne receiver system is under development for the measurement of the fast ions on JT-60U. The heterodyne receiver is based on the recently developed quantum well infrared photodetector (QWIP). The QWIP based receiver has a wide bandwidth capable of detecting the Doppler shifted laser scattering from the fast ions in JT-60U and the alpha particles in a burning fusion reactor. Work in the receiver development² has focused on improving the system efficiency with a QWIP detector to obtain sufficient signal to noise for measuring the fast ions and alpha particles.

1. Instrumentation and Controls Division

2. R. K. Richards, D. P. Hutchinson, C. A. Bennett, M. L. Simpson, H. C. Liu, and M. Buchanan, "Wideband Heterodyne QWIP Receiver Development for Thermonuclear Fusion Measurements," Proceedings of the 194th Electrochemical Society Meeting, Boston, Mass., November 1-6, 1998.