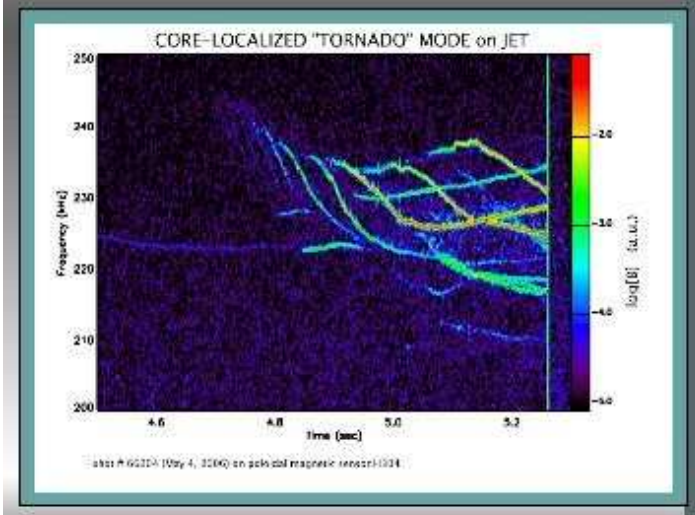
THE DEPARTMENT OF APPLIED PHYSICS & APPLIED MATHEMATICS IN THE FU FOUNDATION SCHOOL OF ENGINEERING & APPLIED SCIENCE

PLASMA PHYSICS COLLOQUIUM



"Active MHD spectroscopy on the Joint European Torus"

Alexander Klein
MIT/JET

Friday, October 27, 2006
3:10 PM, Room 214 Mudd

Magneto-hydrodynamic (MHD) activity in plasmas can provide a wealth of information about plasma parameters. For example, passive observation of unstable MHD modes in toroidal devices can be used to diagnose the safety factor profile. Active MHD spectroscopy is accomplished by driving stable MHD modes with magnetic coils and observing the plasma response. On the JET tokamak this is done using an array of antennas which excite toroidal Alfven eigenmodes (TAEs), together with synchronous detection circuitry hat measures the plasma response in several diagnostic systems. Recently, new antennas were installed which extend the regime studied to medium toroidal mode numbers ($5 < n < 25$). This system will be used to measure damping rates of TAEs in a range of discharges in order to validate theories that predict stability thresholds and damping rates for ITER (TAEs and similar MHD activity can lead to fast ion and alpha particle losses and potentially pose problems for burning plasma scenarios). The upgraded TAE diagnostic will be described and preliminary results will be shown. The possibility of exciting large amplitude TAEs to cause fast ion transport as a method for "burn control" in an ignited plasma will also be discussed.