Annual Report of ITPA

1. Meetings and reports

A full summary of the 10th and 11th meetings of the ITPA MHD Topical Group, and viewgraphs presented, are available at the ITPA website, and only a shortened summary is given here. Also a summary of results on IEA/ITPA co-ordinated experiments was presented at the November 2007

there is no data on this issue, DIII-D has a ve

The favoured solution at the time of the meeting was the blanket vessel interface (BVI) coils mounted

2. High Priority Research Areas

Area	Progress Reported at ITPA Meeting
Continue development of the disruption DB to	

Area	Progress Reported at ITPA Meeting
	Extremely fast response of the plasma - start of a fast current quench within 1 ms from trigger High plasma cooling efficiency -> large radiated power, fast current quench and small vertical forces; High refuelling efficiency (N_e

Area	Progress Reported at ITPA Meeting
	repetition time of the ELM or fishbone is an im

3. Proposed high priority research areas for 2008/9

The following High Priority Research areas are proposed for the MHD Stability TG for 2008/9:-

- development, tests and recommendation on magnetic control used in Plasma Control Simulators[1].

Scope and Tasks for the ITPA Topical Group on Energetic Particle Physics

The general scope of the ITPA Topical Group on Energetic Particle Physics is to tackle the qualitatively new physics element of ITER: dominating particle heating. The group shall provide the experimental basis and the theoretical knowledge to give recommendation for both the conventional and advanced scenarios in ITER in the fields of :

energetic particle driven instabilities (Alfvén waves and energetic particle modes) and their consequences for plasma heating and the first wall material
effects of non-axisymmetric magnetic fields such as field ripple, error/perturbation fields
interaction of fast ions with background MHD (to be coordinated with MHD?)
NBI heating and current drive (to be coordinated with SSO)
runaway electrons (to be coordinated with MHD)

ITER itself will not mark the last stage in the development of fusion heating, and a comprehensive ab-initio understanding of fast particle results on this device will be a necessary prerequisite for bridging the gap to DEMO. The group shall therefore co-ordinate collaborative research activities in existing experimental devices, but in particular also encourage a close collaboration between theory and experiment. In addition, the ITPA topical group shall identify the diagnostic requirements for ITER, needed to extrapolate towards reactor relevant conditions ($Q > 50$).
Publications and presentations on the activities of the TG to fusion journals and international conferences will be promoted.

Tasks
The Topical Group, on the basis of experimental and theoretical studies, should provide input in the field of the following main subjects.

Destabilisation of Alfvén waves and Energetic Particle Modes (EPMs)

measurements of damping rates of Alfvén waves (together with reliable mode identification: eigenfunction, frequency etc) and comparison with theory
investigation of the drive of different kinds of Alfvén waves (TAEs, BAEs, RSAEs,...) and EPMs depending on the fast ion distribution function (energy and pitch angle)
measurements of the influence of fast particle driven instabilities on the fast ion distribution function, expulsion of fast ions, comparison between experiments and state of the art non-linear theory/codes
definition of benchmark test cases for fast particle stability codes
development of relevant diagnostics, recommendations for ITER diagnostics
Prediction of the role of fast particle driven modes in ITER conventional and steady state scenarios, including the power load on the first wall caused by the fast particle loss; recommendations for operation.

[1] Taking into account high cost of ITER equipment and cost of the tokamak discharge, all experiments should be at first simulated and proper optimised with "user friendly" numerical codes, Plasma Control Simulators. Activity on the PCS includes development of "user-friendly" codes, their validation in experiments, improvement of the codes and simulation of ITER discharges with the feedforward and feedback plasma control. Methodology of the codes adaptation to the experimental results should be developed.

Effect of non-axisymmetric magnetic fields

comparison between theoretical predictions and measurements of fast ion losses caused by magnetic field ripple and error fields in present day devices

prediction of the power loads to the first ITER wall caused by error fields, ferritic inserts, test blanket modules and perturbation