Joint Experiment: Transport and Confinement (TC-24)

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Mechanisms for changes in transport due to RMP

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Mechanism	TEXTOR/ Tore-Supra	DIII-D	MAST	LHD	ASDEX
stochastic diffusion	yes	yes	yes	yes	?
open stochastic volume	yes	yes	yes	yes	?
Effects on turbulent transport	yes	yes	yes	?	?
PO/IPC	yes/yes	yes/no	yes/no	yes/ (super dense core?)	weak/no

Mechanisms responsible for pump-out?

•The devices proposed for the experiment offer wide range of plasma types and conditions, i.e. collisionalities, shapes of magnetic equilibrium, spectrum of the perturbation. Common finding therefore should be a generic property of open stochastic volume.

• Does pump-out is always assisted with signatures of stochastic edge (e.g. lobes in divertor patterns)?
• If yes, what is cruical to trigger pump-out: stochastic diffusion or opens stochastic volume or both?

• Effects of $\delta b/B$ on achieved PO/IPC

• In tokamaks, like DIII-D, MAST & TEXTOR there exist already a broad spectrum of conditions, which need data mining.

• New experiments need to be performed on LHD (this campaign September-November), MAST and ASDEX Upgrade.

3D effects on macro- and micro- structures.

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IPP

• Both tokamaks and helical devices show strong link between confinement and turbulence/zonal flow phenomena.

• What is the effect of 3D fields on the amplitude of turbulences/zonal flows?

  • **(q95 with RMP)/iota dependence on zonal flows behaviour/L-H transition**
  DIII-D, TJ-II, ASDEX-Upgrade, MAST : comparison with q95/iota slow ramps and discharges with fixed profiles?
  • ***δb/B***
  LHD, DIII-D, ASDEX-Upgrade, MAST: How the amplitude of perturbation affects level of turbulent transport $\tilde{n} / n$

3D effects on macro- and micro- structures.

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Scenarios to be adressed:
DIII-D: L-mode and H-mode
TJ-II: L-mode and H-mode
LHD: L-mode
MAST: L-mode and LH-transition data is already documented and needs data mining,

Essential diagnostics:
DIII-D: Phase Contrast Imaging, Beam Emission Spectroscopy, Doppler backscattering, resiprocating electrostatic probes (secondary)

TJ-II: Doppler reflectometry, probes and heavy ion beam

LHD: Phase Contrast Imaging, reflectometry(?)

MAST: Beam Emission Spectroscopy, reciprocating probe

Device	Period	Local Key Person	New discharges required
ASDEX Upgrade	2012-2013	W. Suttrop/M. Jakubowski	Yes
DIII-D	2012-2013	G. McKee/T. Evans	Yes
MAST	2012-2013	A. Kirk	Yes
NSTX	2012-2013	S. Kaye	No
LHD	2012-2013	K. Tanaka/M. Jakubowski	Yes
TEXTOR	2012-2013	O. Schmitz	Maybe
TJ-II	2012-2013	C. Hidalgo	Yes
W7-AS	2012-2013	A. Dinklage/M. Hirsch	No