

## Steady-State Simulation Activities in Japan

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# Code Development in Japan

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- **Integrated Code Development**

- **TOPICS**: JAERI Naka

- Based on 1.5D transport code

- Integrated: ECH/ECCD, LH, IC, MHD(Ballooning, Mercier, Tearing)

- Coupled: OFMC, ERATO-J, Resistive MHD, Divertor, ACCOME

- **TASK**: Kyoto Univ

- To be described later

- **Large Code Development**

- **JAERI**: Turbulence, Nonlinear MHD, ...

- **NIFS**: Nonlinear MHD, Monte Carlo in Helical System, ...

- **Kyoto Univ, Yamaguchi Univ, Kyushu Univ**

- **Independent Code Development**

- Universities, NIFS; JAERI, ...

# Integrated Burning Plasma Simulation Initiative

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- **Purpose:**

- Integrated Simulation of Burning Plasma
- Enhancement of Interaction between Various Codes
- Consistent Analysis of Phenomena with Different Time/Space Scales

- **Collaborations:**

- **Theory group:** New approach, Critical issues
- **Experimental group:** Experimental data handling, User-oriented interface
- **Computer science:** New Algorithm, Grid computing
- **ITPA:** International collaboration

- **Activity:**

- Will start in November as a voluntary work (same as ITPA in Japan)
- Research collaboration in NIFS
- Grant-in-Aid for scientific research (to be proposed)

# TASK code system

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- **T**ransport **A**nalyzing **S**ystem for tokama**K**
- **I**ntegrated **C**ode

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<b>TASK/</b>	<b>EQ</b>	<b>Fixed boundary equilibrium</b>	toroidal rotation
	<b>PL</b>	<b>Profile data interface</b>	Exp. data, ITPA Profile DB
	<b>TR</b>	<b>Diffusive radial analysis</b>	$n, u_\phi, T, B_\theta, E_\phi$
	<b>DP</b>	<b>Wave dispersion relation</b>	various velocity distributions
	<b>WR</b>	<b>Ray and beam tracing</b>	EC, LH
	<b>WM</b>	<b>3D full wave analysis</b>	IC, AW, eigenmodes
	<b>FP</b>	<b>Velocity distribution analysis</b>	3D, relativistic, bounce averaged
	<b>EX</b>	<b>Free boundary equilibrium</b>	Start up, Shut down
	<b>TX</b>	<b>Fluid-like transport analysis</b>	$n, \mathbf{u}, T, \mathbf{E}, \mathbf{B}$ , SOL

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# TASK code system

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- Interaction between modules

Out \ In	EQ	PL	TR	DP	WR	WM	FP
TASK/ EQ	\	○					
PL	○	\	○	○	○	○	○
TR		○	\				
DP				\	○	○	
WR			○		\		○
WM			○			\	○
FP			○	○			\

- Some modules are 3D for helical system.
- Some modules are optimized for computer cluster.