

# CWGM11: Mar.11-13,2013

@CIEMAT + Video Conference

(IPP, Kharkov, Kyoto U., NIFS, U.Wisconsin, PPPL) (Participants >50)

**Report: Stellarator News, 141 (Jun. 2013)**

## Sessions

- Flows and Viscosity (S.Satake)
- 3D equilibrium (Y.Suzuki)
- Database
- Energetic Particles (K.Nagaoka)
- Transport validation (M.Yokoyama)
- Island dynamics (Y.Narushima)
- ITPA IOS (E.Ascasibar)
- H mode (M.Hirsch)
- Reactor/System code (R.Wolf)
- Joint Experiment (LHD, H.Yamada)
  
- *Impurity issues frequently mentioned*

# CWGM12 : Sep. 20, 2013

Padova, Italy

After 19<sup>th</sup> ISHW (joint with RFP WS)

**Report: Stellarator News, 142 (Dec. 2013)**

## ■ *Follow Up of 11<sup>th</sup> CWGM (progress, future plans,,)*

- Transport Validation (Yokoyama)
- Flows and Viscosity (Satake)
- AEs, Energetic particles (Yamamoto)
- Link to ITPA (IOS: E.Ascasibar, ..... )
- Information exchange on **joint activities in 2013/2014**
- Data access for joint experiment (Ida)
- On 13<sup>th</sup> CWGM

Under auspices of IEA Implementing Agreement for Cooperation  
in Development of the Stellarator-Heliotron Concept (2.10.1992)



<http://ishcdb.nifs.ac.jp/>

- › CWGM (Coordinated Working Group Meeting)
  - › 12th (Padova, September 20, 2013)
  - › 11th (CIEMAT, March 11- 13, 2013)
  - › 10th (IPP-Greifswald, June 6-8, 2012)
  - › 9th (ANU, January 28, 2012)
  - › 8.0th (NIFS, March 16-17, 2011)
  - › 7th (IPP-Greifswald, June 30 - July 2, 2010) >
  - › 6th (PPPL, October 16, 2009)
  - › 5th (Stuttgart Univ., July 6-8, 2009) (Click "Day")
  - › 4th (CIEMAT, October 20-22, 2008) (See Agenda Page)
  - › 3rd (NIFS, October 23-24, 2007)
  - › 2nd (IPP-Greifswald, June 4-6, 2007)
  - › 1st (Kyoto University, September 19-22, 2006)

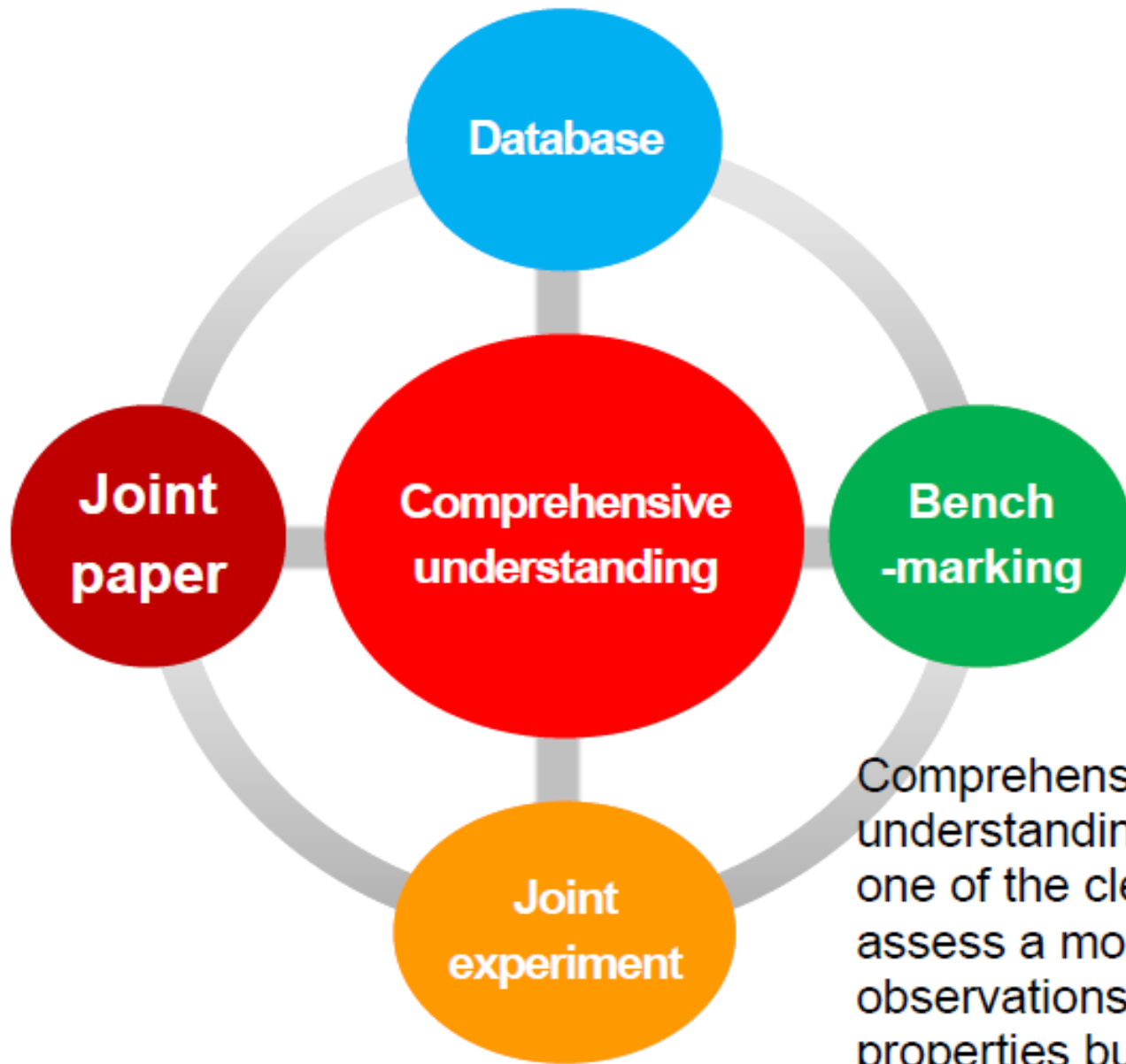
**CWGM** is a programmatic framework for international collaboration among S-H devices,

Under auspices of  
IEA-IA (International Energy Agency, Implementing Agreement) on  
**Co-operation in Development of the Stellarator-Heliotron Concept**  
(Chair, A.Komori)

Gateway to ITPA, SSOCG,

CWGM minutes have been submitted (reported) to

- Stellarator News
- Executive Committee of IA → included in IA Annual Report



Comprehensive and exact understanding of complex physics, one of the cleverest ways is to assess a model by comparing observations with very different properties but with same high scientific quality.

# List of Joint Papers from CWGM activity

## [20th IAEA-FEC (2004)]

H.Yamada et al., "Characterization of **energy confinement** in net-current free plasmas using the **extended International Stellarator Database**", NF45(2005)1684.

## [15th ISW (2005)]

M.Yokoyama et al., "Common Features of **Core Electron-Root Confinement** in Helical Devices", FST 50(2006)327.

A.Dinklage et al., "Assessment of **Global Stellarator Confinement**: Status of the **International Stellarator Confinement Database**", FST 51(2006)1.

## [21st IAEA-FEC (2006)]

M.Yokoyama et al., "**Core electron-root confinement (CERC)** in helical plasmas", NF47(2007)1213.

A.Dinklage et al., "Physical model assessment of the **energy confinement time scaling** in stellarators", NF47(2007)1265.

## [16th ISHW/17th ITC (2007)]

E.Ascasibar et al., "**Effect of Rotational Transform and Magnetic Shear** on Confinement of Stellarators", Plasma and Fusion Res., 3 Special Issue (2008)S1004.

K.McCarthy et al., "Comparison of **Impurity Transport** in Different Magnetic Configurations"

Y.Feng et al., "Comparative **Divertor-Transport** Study for W7-AS and LHD (EMC3/EIRENE)"

M.Kobayashi et al., "**Impurity Retention** Effect in the Edge Ergodic Layer of the Large Helical Device", Plasma and Fusion Res., 3 Special Issue (2008)S1005.

A.Weller et al., "Extensions of the International Stellarator Database by **High- $\beta$**  Data from W7-AS and LHD"

A.Dinklage et al., "Status of the International **Stellarator/Heliotron Profile Database**"

H.Funaba et al., "Data Structure for LHD Plasmas in the **International Stellarator/Heliotron Profile Database**"

K.Nagasaki et al., "**ECCD** Experiments in Heliotron J, TJ-II, CHS, and LHD", J.Plasma and Fusion Res., 3 Special Issue (2008)S1008.

## [22nd IAEA-FEC (2008)]

Y.Feng et al., "**Comparative divertor-transport study** for helical devices", NF49(2009)095002.

R.Burhenn et al., "On **impurity handling** in high performance stellarator/heliotron plasmas", NF49(2009)065005.

A.Weller et al., "**International Stellarator/Heliotron Database** progress on **high-beta confinement and operational boundaries**", NF49(2009)065016.

## [17th ISHW (2009)]

M.Hirsch et al., "Overview of **LH-transition** experiments in helical devices", Contributions to Plasma Physics, 50, Issue6-7(2010)487.

T.Akiyama et al., "Status of a stellarator/heliotron **H-mode** database", Contributions to Plasma Physics, 50, Issue6-7(2010)590.

H.Funaba et al., "**Data Servers** for the International Stellarator/Heliotron Profile Database (ISHPDB)"

S.Sakakibara et al., "Remarks on **Finite Beta Effects** in International Stellarator/Heliotron Scaling"

Y.Narushima et al., "Experimental study of effect of poloidal flow on stability of **magnetic island** in LHD", Contributions to Plasma Physics, 50, Issue6-7(2010)529.

D.Pretty et al., "Results from an international **MHD data mining** collaboration"

M.Ramisch et al., "Investigation of **Turbulent Transport and Shear Flows** in the Edge of Toroidal Plasmas", Contributions to Plasma Physics, 50, Issue8(2010)718.

## [23rd IAEA-FEC (2010)]

M.Hirsch et al., "**H-mode** in Helical Devices"

Y.Narushima et al., "Experimental Study of Poloidal Flow Effect on **Magnetic Island Dynamics** in LHD and TJ-II", NF 51(2011)083030.

## [EPS (2011)]

A.Kus et al., "Identification of variables causing clustering in the **global energy confinement** data by use of discriminant analysis"

## [APS (2011)]

C.Hegna et al., "Healing of **magnetic islands** in stellarators by plasma flow" (*invited talk*)

Y.Narushima et al., "Behavior of poloidal rotation during transition of **magnetic island dynamics** in LHD"

## [18th ISHW (2012)]

M.Yokoyama et al., "Towards **Validation of Confinement Performance Prediction** Based on the **International Profile Database** (Coordinated Working Group)" (*invited talk*)

D.A.Spong et al., "**Energetic particle physics and Alfvén instabilities** in 3D configurations"

C.Hegna et al., "Healing of **magnetic islands** by plasma **flow** in stellarators" (*invited talk*)

# Joint papers in 2013

## **Inter-machine validation study of neoclassical transport modelling in medium- to high-density stellarator-heliotron plasmas**

A. Dinklage, M. Yokoyama, K. Tanaka, J.L. Velasco, D. López-Bruna, C.D. Beidler, S. Satake, E. Ascasíbar, J. Arévalo, J. Baldzuhn, Y. Feng, D. Gates, J. Geiger, K. Ida, M. Isaev, M. Jakubowski, A. López-Fraguas, H. Maaßberg, J. Miyazawa, T. Morisaki, S. Murakami, N. Pablant, S. Kobayashi, R. Seki, C. Suzuki, Y. Suzuki, Yu. Turkin, A. Wakasa, R. Wolf, H. Yamada, M. Yoshinuma, LHD Exp. Group, TJ-II Team and W7-AS Team  
Nucl. Fusion 53 (2013) 063022.

## **Mitigation of NBI-driven Alfvén eigenmodes by electron cyclotron heating in the TJ-II stellarator**

K. Nagaoka, T. Ido, E. Ascasíbar, T. Estrada, S. Yamamoto, A.V. Melnikov, A. Cappa, C. Hidalgo, M.A. Pedrosa, B.Ph. van Milligen, I. Pastor, M. Liniers, M.A. Ochando, A. Shimizu, L.G. Eliseev, S. Ohshima, K. Mukai, Y. Takeiri and the TJ-II Team  
Nucl. Fusion 53 (2013) 072004

## **Influence of the resonant magnetic perturbations on transport in the Large Helical Device**

M.W. Jakubowski, P. Drewelow, S. Masuzaki, K. Tanaka, T.S. Pedersen, T. Akiyama, S. Bozhenkov, A. Dinklage, M. Kobayashi, Y. Narushima, S. Sakakibara, Y. Suzuki, R. Wolf, H. Yamada and the LHD Experiment Group

*Nucl. Fusion* **53** (2013) 113012

## **Control of 3D edge radiation structure with resonant magnetic perturbation fields applied to the stochastic layer and stabilization of radiative divertor plasma in LHD**

M. Kobayashi, S. Masuzaki, I. Yamada, Y. Narushima, C. Suzuki, N. Tamura, B.J. Peterson, S. Morita, C.F. Dong, N. Ohno, S. Yoshimura, Y. Feng, M. Goto, K. Sato, T. Akiyama, K. Tanaka and the LHD experiment group

*Nucl. Fusion* **53** (2013) 093032

## **A magnetic diagnostic code for 3D fusion equilibria**

S A Lazerson, S Sakakibara and Y Suzuki

Plasma Phys. Control. Fusion **55** (2013) 025014.



# Joint presentations in 19<sup>th</sup> ISHW (2013)

S.Yamamoto et al., (invited)

External control of energetic-ion-driven MHD instabilities by ECH/ECCD in helical plasmas

H.Takahashi et al., (invited)

Study of transition phenomena based on poloidal ion viscosity using a biasing electrode in helical system

N.A.Pablant et al.,

Investigation of ion and electron heat transport of high-Te ECH heated discharges in the Large Helical Device

S.Satake et al.,

Benchmark of local and non-local neoclassical transport calculation in Stellarators and Heliotron

E.Ascasibar et al.,

Influence of electron cyclotron heating on the properties of NBI-driven Alfvén eigenmodes observed in the TJ-II stellarator