

CWGM virtual meeting, December 4th, 2023

CWGM Virtual Meeting – 2023-12-04

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for the CWGM Organizing Committee

Arturo Alonso (CIEMAT, Spain)

Benedikt Geiger (UW Madison, USA)

Dorothea Gradic (IPP, Germany)

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1. Introduction and Announcements

- CWGM Organization
- Experimental schedules and proposal submissions

2. Summary of Joint Experiments and Actions from CWGM 2023

3. JA/JE progress:

- TC: Core transport and confinement in multi-ion plasmas
- SOLDIV: Energy, particle and impurity transport in the SOL and divertor
- EPMHD: Energetic Particles, MHD, and High-Beta

Previous in-person CWGM meeting:

- June 5-8, Kyoto, Japan
- <https://event.ipp-hgw.mpg.de/event/395> (password: Stellarator)

Next CWGM meeting:

- September 5-6, Hiroshima University, Japan (*tentative*)

CWGM is organized into three Topical Groups:

Group	Topical Coordinators
TC - Core transport and confinement in multi-ion plasmas	Dr. Masanori Nunami
	Dr. Daniel Carralero
SOLDIV - Energy, particle and impurity transport in the SOL and divertor	Dr. Aaron Bader
	Dr. Victoria Winters
EPMHD - Energetic Particles, MHD, and High-Beta	Dr. Alexander Knieps
	Dr. Adelle Wright

Contact information for Organizing Committee and Topical Coordinators

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Each ITPA group has a stellarator representative to help coordinate stellarator and tokamak activities.

The list of stellarator representatives has recently been updated (in coordination with the IEA SH-TCP).

ITPA Topical Group	Name	
Diagnostics	Ford, Oliver	EU
Energetic Particles	Cappa, Alvaro	EU
Integrated Operating Scenarios	Panadero, Nereo	EU
MHD, Disruptions & Control	Suzuki, Yasuhiro	Japan
Pedestal and Edge Physics	Chaudhary, Neha	EU
Scrape-off Layer & Divertor	Jakubowski, Marcin	EU
Transport & Confinement	Pablant, Novimir	US
Coordinating Committee	Masuzaki, Suguru	Japan

W7-X

Commissioning: Jun-Jul 2024

Op2.2: Sep-Dec 2024

Op2.3: Feb-May 2025

Proposal submission in February 2024 for both Op2.2 and Op2.3. Details about the proposal process expected this month.

LHD

2024 Operation: Mar-Jun 2024

2025 Operation: Oct-Dec 2025

Proposal submission for 2024 campaign concluded on November 30th (last week).

Contact [N. Tamura](#) for possibility of late submission.

MUSE

ongoing, contact [M. Zarnstorf](#)

CTH

ongoing, contact [D. Maurer](#)

TJ-II

2024 Operation: Feb-May 2024

Proposal submission for 2024 campaign concluded on November 30th (last week).

Contact [A. Alonso](#) for post-deadline submission process.

HSX

2023-2024 Operation: ongoing

Proposal submission year-round; Contact [B. Geiger](#).

Heliotron-J

2023-2024 Operation: Oct 2023-Feb 2024

Contact [K. Nagasaki](#) for post-deadline proposal submission.

HIDRA

2023-2024 Operation: ongoing

Proposal submission year-round; Contact [D. Andruczyk](#)

Many proposals for JEs/JAs were submitted during CWGM 2023 (June 5-8, Kyoto, Japan)

- 34 On-site participants
- 24 JEs and JAs submitted through the proposal form
- Many additional JEs and JAs proposed during the meeting

After the CWGM meeting a **Consolidated List** of JA/JEs has been developed

- Combine similar proposals, select for feasibility, select for CWGM relevant
- **15 Consolidated JE/JAs**
 - TC: 8 activities
 - SOLDIV: 3 activities
 - EPMHD: 4 activities

Each proposal is being actively tracked with the following fields:

Proponent	Descriptive title	<i>Medium-term deliverable</i>	<i>Goal for the next CWGM</i>
Coordinator	Proposed participants	Status	Actions / Actionee

Title	Proponent(s)	Coordinator(s)	Goal for next CWGM
Confinement improvement via powder injection - cross machine comparison	F. Nespoli, N. Tamura	F. Nespoli	-Compare the effect of powder injection in "identical" discharges in W7-X and LHD. -Compare TESPEL/powder injections/LBO. In particular, micropellet TESPEL in TJ-II.
Similarity studies in stellarators and validation of scaling laws	A. Dinklage, Y. Suzuki	A. Dinklage, Y. Suzuki	-Comparison of existing data of dimensionally similar scenarios in LHD, TJ-II, H-J. -Definition of common scenario with similar parameters. -Conduction of related experiments in OP2.2 campaign in W7-X.
Study of plasmoid drift and magnetic configurations	N. Panadero	N. Panadero	-Definition of common data formats -Identification of gaps in existing data and proposal of experiments.
Optimization of core particle ratio (H/D, H/He, D/He, H/D/He) control method by edge fueling/exhausting in stellarators	N. Tamura	N. Tamura	-Collect data on isotope ratios in W7X -Discuss methods to control profiles.
Safe plasma operation: plasma termination in thermal quenches	A. Dinklage	A. Dinklage	-Start comparison between existing data in W7X and LHD -Carry out new experiments in OP2.2 campaign for W7-X, fall 2023 campaign in TJ-II.
Stellarator Base Case	J.E. Proll, J.M.G. Regaña	J.E. Proll, J.M.G. Regaña, M. Nunami	Setup for 1st step test using smooth magnetic field low resolution. Setup for 2nd step using field associated with typical W7-X cases.
Turbulent transport database	J.M.G. Regaña	D. Carralero, J.M.G. Regaña	Answer the questions: 1) How reliable are gyrokinetic simulations on predicting turbulent transport? 2) Is turbulence preventing stellarators from accessing reactor relevant regimes?
An experimental data base	J.E. Proll	J.E. Proll (tentative)	-Obtaining overview of gaps in data. -Plan future use for data mining with machine learning methods.

Title	Proponent(s)	Coordinator(s)	Goal for next CWGM
Experimental characterization of divertor performance under varying SOL geometry	V. Winters	F. Reimold	<ul style="list-style-type: none">- Data-mining papers and data from LHD- Systematic characterization of divertor performance in different island configurations in W7-X
Experimental tests of Non-resonant divertor	R. Davies	R. Davies	<ul style="list-style-type: none">- Identification of magnetic field configurations that have NRD-like behavior in W7-X- Determination what configurations can be run in W7-X experiments
Joint scaling law for density limit in W7-X, LHD, and TJ-II	G. Fuchert	G. Fuchert	Data-mining: LHD, W7-X, and TJ-II (HSX)

Title	Proponent(s)	Coordinator(s)	Goal for next CWGM
Standardized definitions of plasma beta	A. Wright	A. Wright	Short publication on arXiv? (With planned submission to a journal?)
Experimental validation of non-linear MHD stability limits	B. Geiger	A. Wright	<ul style="list-style-type: none">- Literature search and data mining for LHD and TJ-II- Identify possible configurations and operational limits for W7-X
Identification of reduced models for AE stability	J.V. Rodriguez	J.V. Rodriguez	<ul style="list-style-type: none">- Create a common framework with codes pre-selected (integration).- Identify a set of discharges to apply the new codes framework (verification and benchmarking).
Collation of AE instability experiment data	A. Knieps	A. Knieps	<ul style="list-style-type: none">- Identification (& hopefully closure) of gaps in LHD exp. data,- Discuss possible participants from JP side

The idea of the CWGM is to be dynamic and relevant: Submit ideas anytime (and volunteer to lead JA/JEs)

The goal of the CWGM is to **foster international collaboration** in stellarator research.

If you have **ideas** for **new Joint Activities or Experiments**:

- *Please* contact a Topical Coordinator
- *Volunteer* to **lead collaborative activities**

Don't wait until the next in-person CWGM to start an **important collaboration!**

- **We have a 'Golden' opportunity:** all experiments have an **experimental campaign within a year.**