

25th IEA SH-TCP Coordinated Working Group Meeting June 3—5, 2025

25th Coordinate Working Group Meeting, Princeton, NJ, USA, June 3-5, 2025

Novimir Pablant^a

<https://sites.google.com/pppl.gov/cwgm2025/home>



CWGM website

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U.S. DEPARTMENT
of ENERGY

CWGM

*To articulate **international experiments and activities** that address **physics and engineering aspects** of relevance for the development of a **viable stellarator/heliotron reactor concept** and for the assessment and definition of its plasma scenarios.*

25th CWGM

Local Organizing Committee:

Chair: **Novimir Pablant (PPPL)**

Co-Chair: **Federico Nespoli (PPPL)**

Local Administrative Coordinator:

Maryellen Andal (PPPL)

mandal@pppl.gov

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We hope you enjoy your visit to the
Princeton Plasma Physics Laboratory



U.S. DEPARTMENT
of ENERGY

PPPL Intro



One of 17 Dept. of
Energy National Labs



Managed by  **PRINCETON
UNIVERSITY**

750+
Lab employees

\$178 million
government funding

90 acres
Princeton, NJ campus

338
annual research
publications

*FY24 figures

PPPL Focus

Fusion Energy

**Strengthening
energy resiliency.**

**Microelectronics &
Quantum Sensors and Devices**

**Building innovative
technologies.**

**Manufacturing &
Industrial Processes**

**Advancing solutions
for the future.**

PPPL Top Projects

LOCATED AT PPPL:



NSTX-U

*National Spherical Torus
Experiment-Upgrade*



FLARE

*Facility for Laboratory
Reconnection Experiment*

INTERNATIONAL PARTNER:



U.S. ITER

PPPL is designing and building diagnostic equipment and developing scientific data and software coding for the international facility.

NSTX-U

National Spherical Torus Experiment-Upgrade

- The Lab's primary **fusion experiment**
- A compact design that makes it an ideal candidate for a **fusion pilot plant** followed by a **commercial reactor**.
- Produces high-pressure plasmas with less energy at lower costs
- A worldwide **user facility** that will test the viability of this design to produce cost-effective fusion energy



FLARE

Facility for Laboratory Reconnection Experiments



- A one-of-a-kind device that probes one of the universe's fundamental mechanisms: **magnetic reconnection**

- Improves understanding of fusion, the sun and Earth's atmosphere

- Results could determine the best ways to minimize damage to power grids and communications networks

A Lab of the Future

Princeton Plasma Innovation Center (PPIC)

*An International Hub of
Fusion Research*

2027



Safety Briefing

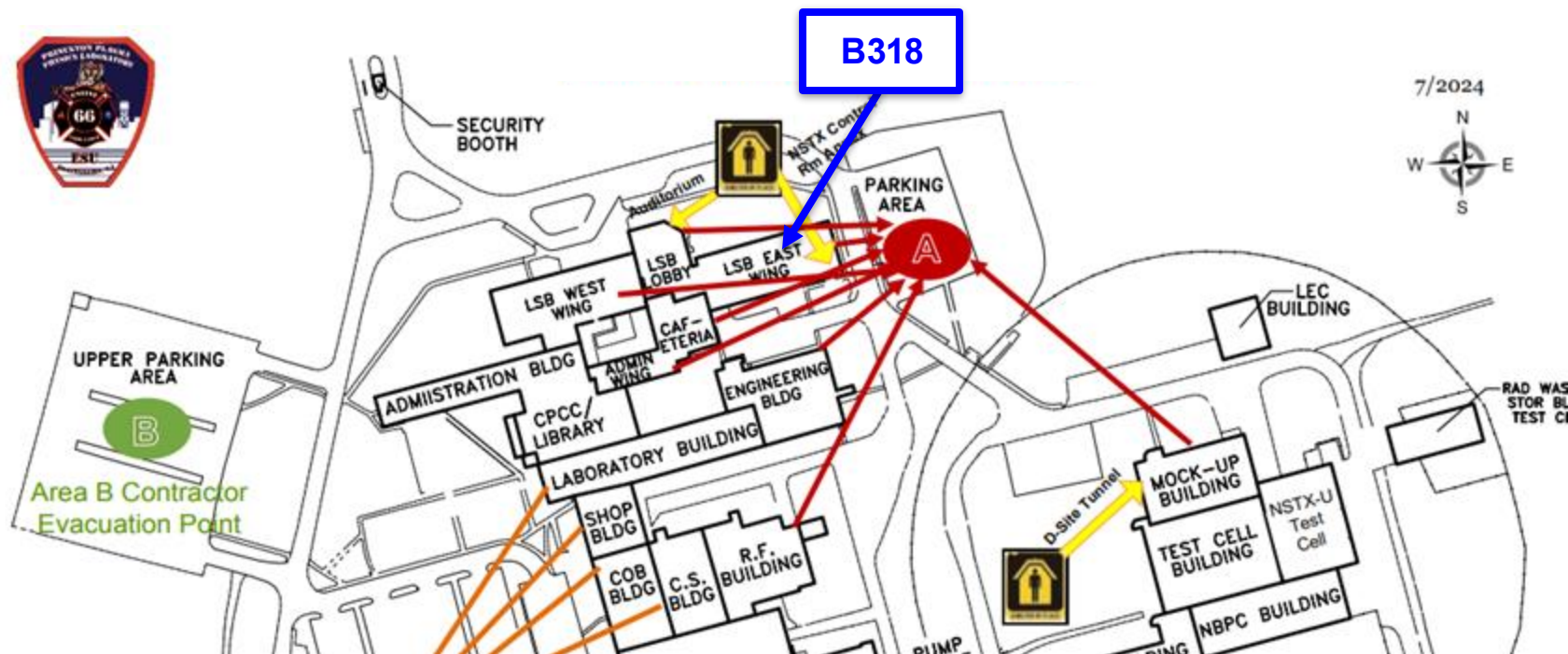
25th Coordinated Working Group Meeting

June 3, 2025

General Information

- Restrooms, cafeteria location
- In the event of an emergency call x3333 or (609) 243-3333
 - Listen for announcements via the EVES System (our public address system)
 - Please use the stairs
 - Use handrails
 - Exercise caution while walking around site (Uneven surfaces, equipment, etc).
 - Evacuation Assembly Area
 - NSTX-U Control Room Annex: D-Site Parking Lot
 - B318: D-Site Parking Lot
 - DCR: C-Site Upper Parking Lot

Evacuation Assembly Area



LEGEND



Common Visitor Meeting Areas



Evacuation Assembly Areas



Shelter-In-Place Locations

Emergency Responses

■ Evacuation (Fire, Smoke, Power Outages)

- Quickly and exit the building with your PPPL host. Walk to the designated Evacuation Assembly Area. Check in with the BEM.

■ Shelter-in-Place (Weather, Environment)

- Take shelter in the nearest designated Shelter-In-Place Location. Close windows and doors. Await further instructions.

■ Lock Down (Active Shooter/Hostile Event)

- Lock doors. Close windows and blinds. Turn off lights. Silence cell phone. Hide under desk and be still and quiet. Await further instructions.

DO NOT OPEN THE DOOR

Blue Light Emergency Towers



- 6 locations around the exterior of the laboratory.
- Presence of these boxes ensures that employees and visitors feel safe.
- In the event of an emergency push the **RED** "PUSH FOR HELP" and be connected to our Emergency Communications Center.

Visitor PPE Requirements for Tours



- Your host will provide you with a PPPL visitor vest and safety glasses.
- Visitors must wear the PPPL visitor vests and safety glasses (and close-toed shoes) while on tours of PPE Required Areas.
- Hard hats or safety helmets are required in NSTX-U and FLARE at all times and in other areas when there is overhead work. Head protection will be provided by PPPL.

Improved Minimum PPE Requirements

Our Environmental, Safety, & Health Directive 5008 Section 8, Chapter 6: Personal Protective Equipment has been updated to elevate the minimum level of protection of our employees and visitors throughout the areas of the site where we are doing our greatest work. Postings, CLASPs, and JHAs will supplement these requirements.

FOR GENERAL WORK & TRAVERSING



CWGM Introduction

25th Coordinated Working Group Meeting
June 3, 2025

The aim of the CWGM is to **coordinate international research** into the **stellarator-heliotron** concept

- Organize **joint research activities** between research groups and labs
- Foster and **promote international collaborations** within the stellarator-heliotron community
- Connect with **synergistic research** on tokamaks and other magnetic field configurations
- Maintain **multi-device databases** to develop scaling laws and validate models

The CWGM is organized under the auspices of the **IEA SH-TCP**

- International Energy Agency **Technology Collaboration Programme** on Stellarators and Heliotrons

The goal of the CWGM meeting is a set of agreed-upon **joint actions** and **joint experiments**

- The **expected outputs** from these activities are **journal publications**

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CWGM is not a conference!

Our focus should be on discussion and planning, not on presenting new results.

CWGM Organizing Committee:

Arturo Alonso (CIEMAT, Spain)

Benedikt Geiger (UW Madison, USA)

Dorothea Gradic (IPP, Germany)

Gen Motojima (NIFS, Japan)

Novmir Pablant (PPPL, USA)

Yuki Takemura (NIFS, Japan)

Topical Group Leaders:

Core Transport and Confinement in Multi-Ion Plasmas

M. Nunami (NIFS)

D. Carralero (CIEMAT)

Energy, Particle, and Impurity Transport In The SOL and Divertor

A. Bader (Type One Energy)

V. Winters (IPP)

Energetic Particles, MHD, and High-Beta

A. Knieps (FZJ)

A. Wright (UW-MADISON)

ID	For book-keeping and quick ref.
Title	What needs to be done?
Medium-term deliverable	Where are we heading for?
Target for the next CWGM	What needs to happen next?
Participants	Who needs to take part?
Coordinator	Who takes care?

Some JA/JEs discussed and “agreed” to during this meeting won’t be fully defined

- The TG leaders or Organizing Committee will then follow up

June 3, 2025		June 4, 2025		June 5, 2025	
8:30am	Welcome Meet & Greet (LSB Lobby) Novimir Pablant and Maryellen Andal	8:30am	ARRIVAL Location: LSB Lobby	8:30am	Arrival Location: LSB Lobby
9:00am	Evacuation Safety Briefing, PPPL Mission and Overview, CWGM Introduction Lead: N. Pablant Location: B318	9:00am	TC - I Lead: M. Nunami/D. Carralero Location: B318	9:00am	SOLDIV - 1 Lead: A. Bader/V. Winters Location: B318
9:20am	Machine Reports I Lead: N. Tamura Location: B318	10:30am	Coffee Break Location: B318	10:30am	Coffee Break Location: B318
10:30am	Coffee Break Location: B318	11:00am	TC- II Lead: M. Nunami/D. Carralero Location: B318	11:00am	SOLDIV - II Lead: A. Bader/V. Winters Location: B318
11:00am	Machine Reports - II Lead: N. Tamura Location: B318	12:30pm	Hostless Lunch Location: Cafeteria	12:30pm	Hostless Lunch Location: Cafeteria
12:30pm	Hostless Lunch Location: Cafeteria	2:00pm	PPP and Stellarator reactor activities I Lead: G. Motojima/A. Alonso Location: B318	2:00pm	Discussion (LHD) proposal preparation and others) Lead: G. Motojima Location: B318
2:00pm	EPMHD - I Lead: A. Wright/A. Kneips Location: B318	3:30pm	Coffee Break Location: B318	3:30pm	Coffee Break Location: B318
3:30pm	Tours Lead: F. Nespoli / N. Pablant Location: FLARE, NCSX, MUSE 20 min per location - Tour video is 4 min long	4:00pm	PPP and Stellarator reactor activities II Lead: G. Motojima/A. Alonso Location: B-318	4:00pm	Summary and Actions Lead: A. Alonso/N. Pablant Location: B318
5:00PM	End of Day 1	5:30pm	End of Day 2	5:30pm	End of Workshop
		6:30pm	Hostless Dinner at Rocky Hill Tavern Location: 137 Washington St, Rocky Hill, NJ 08553		

<https://drive.google.com/file/d/1WFvJHG3TA2WLDGe1dap2rgvgZpTgmbQs/view>



Detailed Agenda: Day 1

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25th Coordinated Working Group Meeting, PPPL, June 3-5 2025									
HSX	PPPL	W7-X, T2R	CFQS	LHD	Tuesday, 3 June				
UTC-5	UTC-4	UTC+2	UTC+8	UTC+9	Session (organisers)	Subject	Presenter	Duration	
08:00	09:00	15:00	21:00	22:00	Introduction and Machine Reports - I (Pablant, Gradic/Tamura)	Welcome & introduction	N. Pablant	00:20	20'
08:20	09:20	15:20	21:20	22:20		Heliotron J	K. Nagasaki	00:15	10' + 5'
08:35	09:35	15:35	21:35	22:35		HSX	B. Geiger	00:15	10' + 5'
08:50	09:50	15:50	21:50	22:50		TJ-II	A. Alonso	00:15	10' + 5'
09:05	10:05	16:05	22:05	23:05		LHD	G. Motojima / Y. Takemura	00:15	10' + 5'
09:20	10:20	16:20	22:20	23:20		Others (Codes & HPC)	S. Satake	00:15	10' + 5'
09:35	10:35	16:35	22:35	23:35	Coffee break			00:25	
10:00	11:00	17:00	23:00	00:00	Machine Reports - II (Gradic/Tamura, Pablant)	W7-X (TC)	D. Carralero	00:15	10' + 5'
10:15	11:15	17:15	23:15	00:15		W7-X (SOL/DIV)	D. Gradic	00:15	10' + 5'
10:30	11:30	17:30	23:30	00:30		W7-X (EP/MHD)	A. Knieps	00:15	10' + 5'
10:45	11:45	17:45	23:45	00:45		W7-X (Plan)	M. Jakubowski	00:10	5' + 5'
10:55	11:55	17:55	23:55	00:55		Others (Database)	A. Dinklage	00:15	10' + 5'
11:10	12:10	18:10	00:10	01:10		Discussion	All	00:20	20'
11:30	12:30	18:30	00:30	01:30	Lunch break			01:30	
13:00	14:00	20:00	02:00	03:00	EPMHD - I (Wright, Knieps)	MHD studies on W7-X, potential inputs towards LHD experiments	A. Knieps	00:30	30'
13:30	14:30	20:30	02:30	03:30		LHD MHD studies update	Y. Takemura	00:30	20'
14:00	15:00	21:00	03:00	04:00		Discussion		00:20	20'
14:20	15:20	21:20	03:20	04:20	PPPL tour			01:10	70'
15:30	16:30	22:30	04:30	05:30					



Detailed Agenda: Day 2

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25th Coordinated Working Group Meeting, PPPL, June 3-5 2025									
RSK	PPPL	W7-X, TJ-II	OFB	LHD	Wednesday, 4 June				
UTC-5	UTC-4	UTC+2	UTC+8	UTC+9	Session (organisers)	Subject	Presenter	Duration	
08:00	09:00	15:00	21:00	22:00	TC - I (Carralero, Nunami)	Overview of the status of the ongoing JE/JA	D. Carralero / M. Nunami	00:20	20'
08:20	09:20	15:20	21:20	22:20		Status of W7-X/LHD comparative studies and plans for the upcoming LHD campaign	K. Tanaka	00:20	15' + 5'
08:40	09:40	15:40	21:40	22:40		Summary of EM turbulence studies in the OP2.2 and OP2.3 campaigns in W7-X	K. Aleinikova	00:20	15' + 5'
09:00	10:00	16:00	22:00	23:00		Overview of the impurity injection studies and remaining work for LHD	F. Nespoli	00:15	15'
09:15	10:15	16:15	22:15	23:15		Discussion	All	00:15	15'
09:30	10:30	16:30	22:30	23:30	Coffee break			00:30	
10:00	11:00	17:00	23:00	00:00	TC - II (Carralero, Nunami)	Validation of the GENE-Tango-KNOSOS suite in W7-X and remaining work in the way for reactor-relevant predictions	D. Fernando	00:20	15' + 5'
10:20	11:20	17:20	23:20	00:20		Transport studies with stella: evaluation of massive parametric scans with TJ-II and W7-X data	J. M. García-Regaña	00:20	15' + 5'
10:40	11:40	17:40	23:40	00:40		Emergence of sub-threshold KBMs in W7-X high beta plasmas	P. Mulholland	00:20	15' + 5'
11:00	12:00	18:00	00:00	01:00		Discussion	All	00:30	30'
11:30	12:30	18:30	00:30	01:30	Lunch break			01:30	
13:00	14:00	20:00	02:00	03:00	PPP and Stellarator Reactor Activities - I (Alonso, Motojima, Pablant)	Hellas Physics GAPs (EU)	Marcin Jakubowski	00:30	15'
13:30	14:30	20:30	02:30	03:30		STARS Workshop (US)	Novimir Pablant	00:30	15'
14:00	15:00	21:00	03:00	04:00		Fusion Strategy (Japan)	Gen Motojima	00:30	15'
14:30	15:30	21:30	03:30	04:30	Coffee break			00:30	
15:00	16:00	22:00	04:00	05:00	PPP and Stellarator Reactor Activities - II (Alonso, Motojima, Pablant)	Proxima Fusion's path towards a first-of-a-kind stellarator power plant: entry points for collaborations	J. Lion	00:30	15' + 10'
15:30	16:30	22:30	04:30	05:30		Perspectives on science & technology research priorities and PPP within the context of international stellarator activities	W. Guttenfelder	00:30	15' + 10'
16:00	17:00	23:00	05:00	06:00		Helical Fusion's Current R&D Status and Future Plans towards Helical Fusion Pilot Plant	T. Goto	00:30	15' + 10'
16:30	17:30	23:30	05:30	06:30					



25th Coordinated Working Group Meeting, PPPL, June 3-5 2025									
HSX	PPPL	WT-X, T24	CFDS	LHD	Thursday, 5 June				
UTC-5	UTC-4	UTC+2	UTC+8	UTC+9	Session (organisers)	Subject	Presenter	Duration	
08:00	09:00	15:00	21:00	22:00	SOLDIV - I (Bader, Winters)	Closed island divertor design	A. Kharwandikar (V. Winters)	00:30	15' + 5'
08:30	09:30	15:30	21:30	22:30		Overview of NRD work	A. Bader	00:30	30'
09:00	10:00	16:00	22:00	23:00		Discussion	All	00:30	30'
09:30	10:30	16:30	22:30	23:30	Coffee break			00:30	
10:00	11:00	17:00	23:00	00:00	SOLDIV - II (Bader, Winters)	Inter-device database update	D. Boeyaert	00:30	20' + 5'
10:30	11:30	17:30	23:30	00:30		TJ-II density limit database	J. Gallego	00:30	20' + 5'
11:00	12:00	18:00	00:00	01:00		Discussion	All	00:30	30'
11:30	12:30	18:30	00:30	01:30	Lunch break			01:30	
13:00	14:00	20:00	02:00	03:00	Discussion (LHD experimental proposals and others) (Motojima, Pablant)		All	01:30	
14:30	15:30	21:30	03:30	04:30	Coffee break			00:30	
15:00	16:00	22:00	04:00	05:00	Summary, next meeting and actions (Alonso, Pablant)		N. Pablant / A. Alonso and All	01:30	
16:30	17:30	23:30	05:30	06:30					



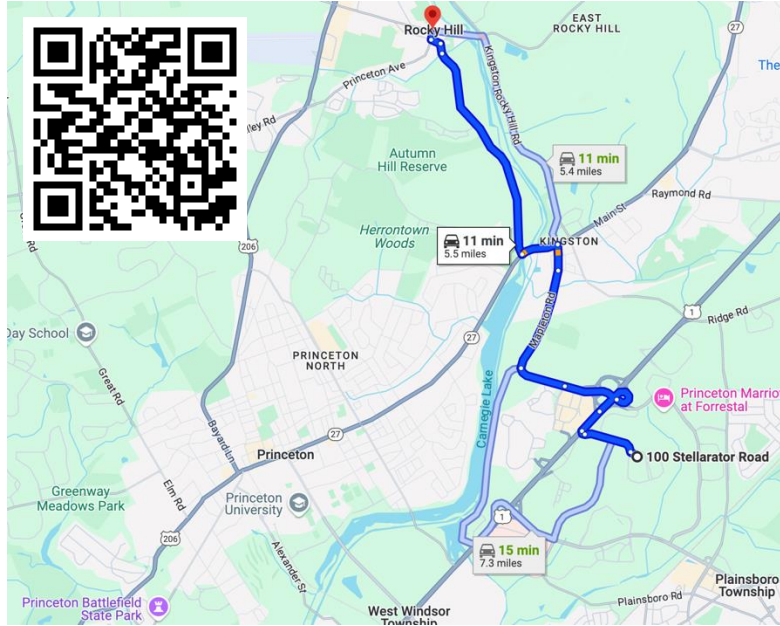
No-Host Workshop Dinner: Wednesday June 4th

Historic Rocky Hill Inn & Tavern

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History Rocky Hill Inn and Tavern

137 Washington Street, Rocky Hill, NJ 08553



<https://maps.app.goo.gl/Z5kgjXosLeqsabi8>



CWGM

This year will be the last LHD campaign

26

In this years CWGM, we should pay special attention to opportunities on LHD

The call for **experiment proposals** for the **FINAL LHD experiment campaign** is now open

- Open from June 2nd to June 13th

https://www-lhd.nifs.ac.jp/rails/exp_proposal/exp_proposal

The final CWGM session on day 3 is dedicated to LHD proposal discussion