WPTE Experimental program and synergies with WPTM

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WPTE Research Topic Structure

WPTE framework devoted to advance EUROfusion on:

- **Mission I**: Plasma Regimes of Operation (and fusion technology)
- **Mission II**: Heat exhaust solutions

- Use available European tokamaks (**AUG, TCV, WEST, MAST-U**) and past experiments (**JET**) to advance ITER and Pilot Plant design
- Research Topics (01-09) to address specific deliverables with a staged integration and cross-device approach
- RT-11 dedicated to JET analysis from previous research programmes

WPTE priorities for the EUROfusion grant extension (2026-2027):

- Complete ongoing analyses maximising the scientific outcome of FP9, promoting new synergies with WPTM
- Ensure a proper record of the progress made before the start of FP10 (2028): track the modelling done and the needs of the program
- Promote the reproducibility of the published scientific results
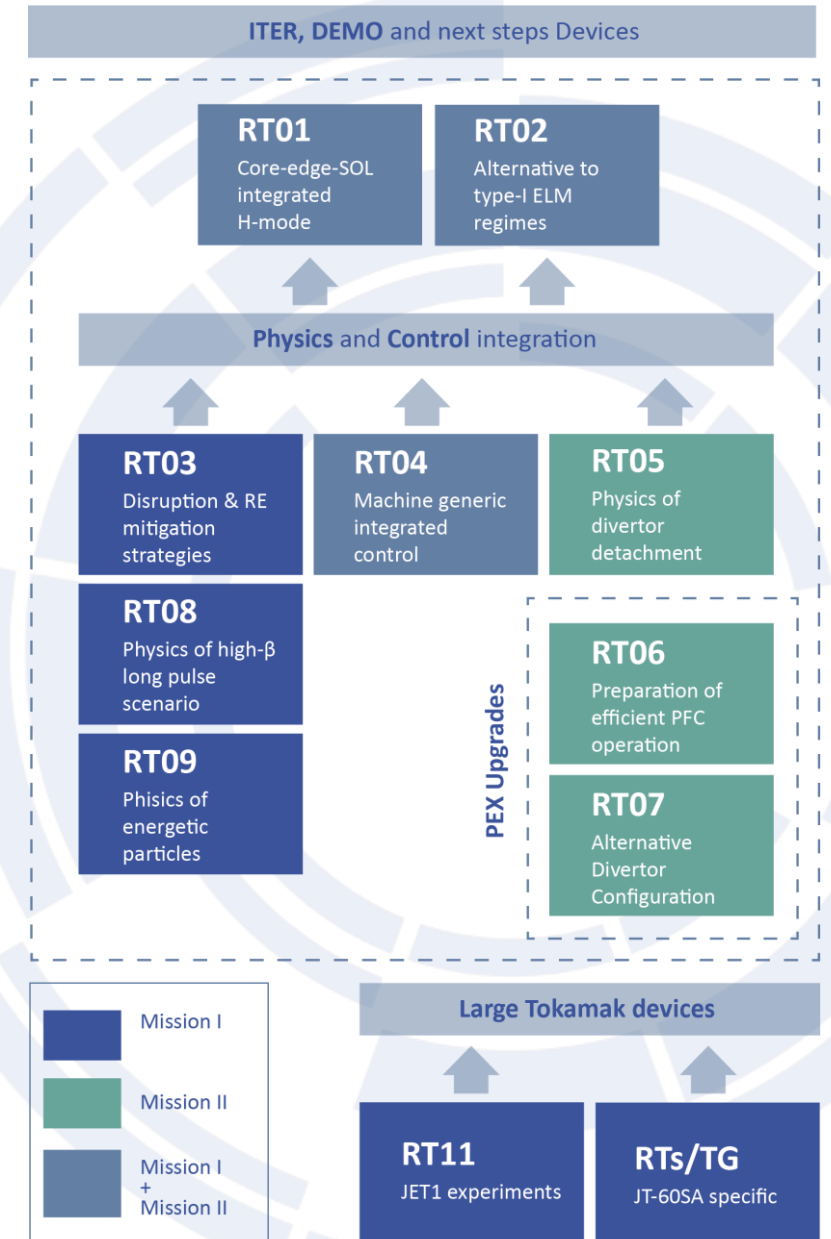
WPTE Research Topics: synergies and modelling needs

Research Topic	Scientific Objective	TSVV synergy Established	TSVV synergy Starting	TSVV synergy Strategic	Modelling needs
RT-01	**Core-Edge-SOL integrated H-mode scenario compatible with exhaust constraints in support of ITER:** • Seeded JET-ITER baseline • Low collisionality / peeling limited plasmas • Er and turbulence	**TSVV-H**	TSVV-B	**TSVV-A, TSVV-E** **TSVV-A,** TSVV-F **TSVV-A, TSVV-B**	**JOREK** **GK, GENE-X** **GYSELA,** **SOLEDGE**
RT-02	**Physics understanding of alternatives to Type-I ELMs:** • QCE • Interpretation of RMP experiments • NT	**TSVV-B** (AUG) **TSVV-B, TSVV-A**	TSVV-B (JET?)	**TSVV-A, TSVV-C** TSVV-F, **TSVV-B**	**GENE, GENE-X,** **SOLPS** **JOREK**
RT-03	**Strategies for disruption and run-away mitigation**	**TSVV-F**			**JOREK**
RT-04	**Physics-based machine generic systems for an integrated control of plasma discharge**			**TSVV-H (potential)**	
RT-05	**Physics of divertor detachment and its control for ITER, DEMO and HELIAS operation**	**TSVV-B**		**TSVV-A, TSVV-C,** **TSVV-H, TSVV-K**	**GK, JINTRAC,** **GENE-X, SOLPS**
RT-06	**Preparation of efficient Plasma Facing Components (PFC) operation for ITER, DEMO and HELIAS**	**TSVV-D,** TSVV-E, TSVV-K			
RT-07	**Physics understanding of alternative divertor configurations as risk mitigation for DEMO**	**TSVV-B**		**TSVV-D**	**SOLPS,** **SOLEDGE**
RT-08	**Physics and operational basis for high beta long pulse scenarios**	**TSVV-H**	TSVV-F	**TSVV-A**	**JOREK, GK**
RT-09	**Physics understanding of energetics particles confinement and their interplay with thermal plasma**	**TSVV-G**			

WPTE actions to improve FP9 documentation

- Current Wiki pages track the Tokamak Scientific Exploitation

- New Wikis dedicated to A&M under discussion (uncertainty on the future framework)

    1. Definition of the pulse datasets → **Facilitate modelling-oriented data access**

    2. Analysis progress and open questions → **Improve traceability of ongoing work**

    3. Modelling activities and validation status → **Enable prioritization of A&M**

    4. Links to publications, reports and presentations → **Support cross-RT and TE-TM synergies**

    5. Cross-device and cross-RT connection highlighted → **Support knowledge transfer**

List of notable pulses [edit | edit source]

Illustrative example: JET M21-03 Wiki in RT-11

This list is not exhaustive: check also Wiki pages M21-03 on JDC ↗, Wiki pages M18-01 on JDC ↗

Unless differently specified for experimental data the Scientific Coordinators refer to public JET #PPF (i.e. dda/jetppf/seq=0)

pulse	comment	Ip [MA] / Bt [T]	isotope	Analysis	Modelling	References
104461	first DTE3 good pulse, gas scaled from JPN 99512 with JINTRAC-QLK predictive modelling to compensate D-NBI fuelling	3.0 MA / 2.8 T	DT	• EFTP: ZC5361/EFTP/401 (J. Lombardo) • MHD (G. Pucella) • Impurities (N. Wendler) ↗ • Prad reconstructions: epeluso/B5ML/574 (E. Peluso)	• TRANSP interpretative: 104461Q65 (J. Lombardo) • JINTRAC-QuaLiKiz predictive:	• Zotta *et al* at 50th EPS Conference 2024 ↗ • Lombardo *et al* 2025 *Nucl. Fusion* **65** 096009 ↗ • Van Eester *et al* at 25th RF Conference 2025 ↗

Implementing FAIR principles in WPTE (and EUROfusion)

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Ensuring traceability and reproducibility across experiments, data and modelling

- WPTE is promoting a discussion within PSD and DSO (DMP) to realize a citable repository for EF publications.
- Strategic action in view of potential broader access to EU machine data
- It needs to be supported by a "legal framework" (e.g. associated to clearance on EF pinboard)
- Ensure that every publication has attached an accessible repository with data/processing/modelling

Final remarks

- WPTE continues its ambitious programme with a strong cross-device perspective

- During the EUROfusion Grant Extension (2026-2027), WPTE will strengthen traceability and reproducibility of FP9 analysis in preparation for the next Framework Programme

  - Promote closer and more structured synergies with WPTM, enabling mutual exchange of information and results and helping to avoid duplication of effort
  - Ongoing integration of modelling activities within WPTE to support prioritisation of A&M efforts
  - Improve identification and collection of WPTE datasets used within WPTM in TSVV activities
  - Discuss within the PSD strategies for preserving analysis knowledge and data assets for the next Framework Program
  - Develop a citable repository framework to support traceability and reproducibility of the results