



To: the members of the General Assembly

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Call for Participation in the Work Package PWIE activities related to selection of Plasma Facing components for COMPASS-U

1. Purpose of the call

In support of COMPASS-U and in preparation for its exploitation, the EUROfusion members are invited to propose participation in the activities related to selection of Plasma Facing components for COMPASS-U under the Work Package Plasma-Wall Interactions and Exhaust (WP PWIE), during the period of 2024-2025.

2. Overview WPPWIE

WP PWIE is a key work package under Mission 2 contributing to the development and implementation of EUROfusion's strategy on plasma-facing materials compatible exhaust solutions and plasma-wall interactions-induced limitations regarding lifetime and safety. The activities within this call are specifically related to two sub-projects (SP) under WP PWIE, and for the participation in one or more of the following tasks/objectives:

3. Brief description of the new COMPASS-U activities

This call aims to gather proposals for the participation in one or more of the following tasks/objectives:

SP A:

COMPASS-U plasma-facing material qualification and Pre-/Post Characterization:

- Qualification of different tungsten plasma-facing materials (PFM) for COMPASS-U plasma-facing components (PFCs) (first wall and divertor) during steady-state and transient heat loads.
- Pre-characterization (e.g., micro-structure observations, density, mechanical properties, thermal conductivity, etc.) to rank the different tungsten materials
- Post-characterization after HHF tests (measurement of roughening, observations of cracking and possibly recrystallization/grain growth) compared to reference tungsten



High heat flux tests of COMPASS-U PFCs:

- Combined plasma and ELM-like loading of tungsten-based materials in linear plasma devices (e.g. PSI-2 and/or Magnum-PSI) to mimic expected operation in COMPASS-U
- Cyclic high heat flux tests (e.g. Judith 2) on large tungsten samples or COMPASS-U PFC mock-ups to simulate steady-state plasma loading at
 - the inner and outer divertor target plate with narrow heat flux width
 - the first wall limiters during ramp up and ramp down conditions

SP D:

Plasma background modelling for COMPASS-U:

- Simulation of expected basic and high-performance plasma discharges of COMPASS U with extended grid version and impurity seeding (e.g. SOLPS-ITER)
- Provision of SOL plasma profiles and divertor plasma parameters as input for plasma-wall interaction modelling.

Plasma-wall interaction modelling and impurity transport modelling for COMPASS-U:

- Simulation of W transport in the COMPASS U SOL using plasma background from above mentioned plasma background modelling
- Performing W and Sn (Liquid Metal) erosion and transport simulations using improved plasma background profiles with extended grid to the wall (e.g. ERO2.0)

Particle-in-cell simulations of the plasma boundary and sheath for COMPASS-U:

- Simulation radially non uniform plasma sheath in COMPASS U aiming at study of radial profiles of heat and the particle loads to tile surfaces, gaps, and probes (e.g. with SPICE2)
- Fully kinetic modelling of the Compass-U Ne and Ar seeded SOL in 1D (e.g. with BIT1)

The estimated resources available for these tasks are 18 PM for SPA and 12 PM for SPD for 2024 and 2025 each. Additional resources for the operation of the facilities (e.g. JUDITH-2, PSI-2 and MAGNUM-PSI) are available as well but will be distributed within WPPWIE.

4. Eligibility criteria

Only the members of the EUROfusion consortium, i.e. Beneficiaries, are eligible to answer the call. Affiliated entities and potential industry contributions have to be proposed by the Beneficiary they are affiliated with. Upon submission, the PMU will perform a formal check of the proposals. Non-compliant or incomplete proposals could be rejected.

The PL, supported by the PMU, will perform a further check on scope, competences and general quality, in particular whether the proposal is in line with the Work Package objectives. If needed, the PL or the PMU will contact the Beneficiary for further information or an update of the proposal.



5. Submission of proposals

Proposals must be submitted through the EUROfusion Information Management System (IMS), <https://ims.euro-fusion.org/fp9/> by the General Assembly member not later than 23.07.2024.

The proposals shall include:

- **Indicative resources** proposed by the Beneficiary for the years 2024 and 2025. These must be entered directly through the online proposal form in IMS.
- **Call Response Form** prepared outside of IMS following the provided template (Annex 1) to be uploaded to the online proposal form as attachment (PDF or DOCX format).

6. Selection/ Evaluation process

The PL for WP PWIE will select the contributions. If needed, during the evaluation period, the PL may contact representatives of the Beneficiaries for further clarification and for negotiation on the activities and the size of the contribution. Upon completion of the assessment, the PL will make a recommendation to the PMU including a justification for the selection of the Beneficiaries' contributions to execute the tasks, as well as the financial resources required for this purpose.

7. Feedback to Beneficiaries

The PMU will communicate to all Beneficiaries the outcome of the selection together with the financial resource allocation. The detailed allocation of resources for 2024 will be defined in the new tasks and level-3 deliverables related to the COMPASS-U activities in the WP-PWIE Subprojects A and D.

For the year 2025, the indicative budget per Beneficiary and per Subproject will be defined as well. The detailed resource distribution and definition of tasks and level-3 deliverables for 2025 will follow in the beginning of 2025.

In case of any questions, please contact:

- PMU Coordination Officer: David Douai (David.Douai@euro-fusion.org)
- PL: Sebastijan Brezinsek (S.Brezinsek@fz-juelich.de)
- PSO: Michael Reinhart (M.Reinhart@fz-juelich.de)

8. Indicative Timeline of Implementation

- Launch of the call: 11th July 2024
- Deadline for proposals: 23rd July 2024
- Evaluation and selection completed: 29th July 2024

Yours sincerely,

Ambrogio Fasoli
Programme Manager

- Annex 1 – Call_Response_Form_COMPASS-U_PWIE.docx