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| **WPPWIE Deliverables Status Report** | | | | | **Date:** | | | 01-Sep-2022 | | |
| **Subproject:** | SP D / PSI and SOL Modelling | | | | **Deliverable ID** | | | PWIE-SP D.1.T-T002-D004 | | |
| **Deliverable owner:** | S. Xu (FZJ) | | | | **Deliverable due date** | | | 31-12-2022 | | |
| **WP Leader:**  **SP Coordinator:** | S. Brezinsek (FZJ)  A. Kirschner (FZJ) | | | |  | | |  | | |
| **Task title:** | SP D.1 Plasma Boundary Modelling | | | | | | | | | |
| **Deliverable title:** | Plasma background parameters of W7-X for modelling of impurity migration experiments as well as PSI-2 (FZJ) | | | | | | | | | |
| **Status:** |  | **Completed** |  | **Partially completed** | |  | **Delayed** | |  | **Cancelled** |
| Please write a short status report (max. ½ pages) here.  Please check the status of the deliverable(s) with a “x” in the row above.  If the deliverable(s) are delayed, please also indicate an estimated completion date in the report text.  If the deliverable(s) include machine time, please indicate the number of days that have been used for the deliverable(s) in the report text.  For reference, the specification of this task from the PMP is given below. | | | | | | | | | | |
| **Reference from PMP:** | | | | | | | | | | |
| Plasma modelling activities focus on the production of background plasma parameters, which are needed as input for migration modelling. This includes 1D, 2D and 3D modelling of specific experiments (e.g. the tokamaks AUG, JET-ILW, WEST, the stellarator W7-X and linear devices like MAGNUM-PSI, PSI-2 or GyM) and also predictive studies (e.g. for ITER, DEMO or the linear device JULE-PSI). Besides modelling of "volumetric" plasma parameters such as temperature, density and flow velocity also near surface parameters considering the detailed sheath characteristics in front of surfaces are considered The plasma conditions can cover inter- and intra-ELM phases, ELM-averaged and detached conditions. Turbulence processes can be considered. The modelling should consider H, D, T plasmas including seeding species, further impurities from wall erosion and helium.  Plasma codes like SOLEDGE3X-EIRENE, SOLPS, EMC3-EIRENE, EDGE2D-EIRENE and PIC-based codes can be applied to address the modelling of plasma background parameters. | | | | | | | | | | |
| **Inputs required:**  Experimental plasma parameters to be provided by WEST, MAGNUM, GyM, W7-X, AUG, JET-ILW, PSI-2 and SP X. Tokamak information from WP TE and WP JET and stellarator from WP W7X. | | | | | | | | | | |
| **Tasks to be performed:**   * Modelling (SOLEDGE3X-EIRENE) of background plasmas to be used as input for migration modelling: WEST (CEA) * Modelling (SOLPS-ITER) of background plasmas to be used as input for migration modelling: linear devices (DIFFER) * Modelling (SOLPS-ITER) of background plasmas to be used as input for migration modelling: GyM (ENEA) * Modelling (EMC3-EIRENE) of background plasmas to be used as input for migration modelling: W7-X and PSI-2 (FZJ) * PIC modelling of collisional sheath (IPP.CR) * PIC modelling for emissive sheath at hot surfaces (VR)   Modelling (e.g. SOLPS-ITER or EDGE2D-EIRENE) of background plasmas to be used as input for migration modelling: AUG, JET-ILW (VTT) | | | | | | | | | | |
| **Deliverables:**   |  |  | | --- | --- | | **Deliverable ID** | **Deliverable Title** | | D001 | Plasma background parameters of WEST for modelling of impurity migration experiments (focus on He and D discharges) (CEA) | | D002 | Plasma background parameters of linear devices (in particular MAGNUM-PSI) for modelling of impurity migration experiments (DIFFER) | | D003 | Plasma background parameters of GyM for modelling of impurity migration experiments (ENEA) | | D004 | Plasma background parameters of W7-X for modelling of impurity migration experiments as well as PSI-2 (FZJ) | | D005 | Characterization of the emissive and collisional plasma sheath (considering ELMy discharges, rough surfaces, DT plasma) (IPP.CR) | | D006 | Semi-empirical analytic expressions of emitted current escaping form tungsten surfaces (inter- and intra-ELM conditions) (VR) | | D007 | Plasma background parameters of AUG and JET-ILW for modelling of impurity migration experiments (VTT) | | | | | | | | | | | |
| **Management Information**  **Human Resources (2022)**:   |  |  |  |  | | --- | --- | --- | --- | | **Deliverable Owner** | **Beneficiary** | **PM** | **Deliverable (Team)** | | G. Ciraolo | CEA | 2 | D001 (GY. Marandet, NN) | | E. Westerhof | DIFFER | 2 | D002 (E. Westerhof, J. Gonzalez- Munoz) | | M. Passoni | ENEA | 2 | D003 (M. Passoni, E. Tonello) | | S. Xu | FZJ | 4 | D004 (S. Xu, NN) | | D. Tskhakaya | IPP.CR | 5 | D005 (D. Tskhakaya, M. Komm, A. Podolnik) | | S. Ratynskaia | VR | 4 | D006 (S. Ratynskaia, P. Tolias) | | M. Groth | VTT | 3 | D007 (M. Groth, A. Järvinen, H. Kumpulainen) | | **Total** |  | 22 |  |   **Machine Resources (2022):**   |  |  |  |  | | --- | --- | --- | --- | | **Device** | **Beneficiary** | **Days** | **Related Deliverable** | | n.a. |  |  |  |   **Other resources:**   * HPC requests   **Collaborations:**   * WPTE, WPW7X and internal program of W-7X, AUG * IO and ITPA DivSOL   **Other information:**  Connected to TSVVs associated with WPPWIE | | | | | | | | | | |