Minutes: FSD science meetings 2021

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| ***Date/Time***20/09/2021 – 9:30-12:30 | ***Location***Zoom |
| ***Chairs:***Volker Naulin (Head of FSD)***Invitees:*****PMU:** Tony Donné (Project Manager); Sara Moradi (WPTE& WPW7-X Coordinator); Denis Kalupin (WPACH & ENRs Coordinator); Joao Figuereido (WPSA & WP PrIO Coordinator); David Douai (WPPWIE Coordinator)**WPTE:** Marco Wischmeier (Task Force Leader); Emmanuel Joffrin (Task Force Leader); Emmanuelle Tsitrone (Deputy Task Force Leader); Antti Hakola (Deputy Task Force Leader); Benoit Labit (Deputy Task Force Leader); Nicola Vianello (Deputy Task Force Leader); **WPPrIO:** Xavier Litaudon (Project Leader); Gloria Falchetto (Project Support Officer)**WPW7X:** Andreas Dinklage (Task Force Leader); Arturo Alonso (Deputy Task Force Leader); Ivan Calvo (Deputy Task Force Leader); Caroline Petersen (Project Support Officer) **WPPWIE:** Sebastijan Brezinsek(Project Leader); Giuseppe Calabro (Deputy Project Leader) Michael Reinhard (Project Support Officer); Alexandra de Schepper (Project Support Officer)**WPSA:** Carlo Sozzi (Project Leader); Alessandra Di Bastiano (Project Support Officer)**WPAC/TSVVs:** Frank Jenko (Chair of E-TASC Scientific Board)**DCT:** Hartmut Zohm, Sven Wiesen, Mattia Siccinio**ITER IO:** Alberto Loarte; Richard Pitts; Tim Luce; Simon Pinches |
| ***INDICO info:***<https://indico.euro-fusion.org/event/1314/> |

Minutes of WPTE session:

*Marco Wischmeier* (MW) presented the progress in 2021 towards the objectives defined in 2021 AWP for each Research Topic (see the related slides on the INDICO).

*Xavier Litaudon* (XL) asked on the ITER modeling capabilities and if results can be extrapolated for ITER?

*MW* responded that in his view there are still remaining gaps for a full modelling of the ITER plasmas, and there are not enough resources available. Thus, it is important to know what is done on the IO side and what is being developed as part of EUROfusion activities.

*Jeronimo Garcia* (JG) commented that the JET DT programme deliverables have been specifically aimed to extrapolate to ITER. JG also asked about the maturity of the fast ion losses modeling under RT10 and if these can be extrapolated for ITER?

*MW* responded that the method is ok and the tools are being developed, however, the extrapolation to ITER is not possible yet.

*JG* also asked about the information on the steady-state scenario development under RT12. *MW* responded that AUG has had an internal programme on these topics and we need to see if we can get access to those data.

*Richard Pitts* (RP) presented the ITER priorities and needs related to the WPTE programme (see the related slides on the INDICO). He provided a list of the priorities:

* Disruption and RE load characterization in PFP is very important for the design of DMS. As there will be the PRD review in 2022. With SPI on JET and AUG provides a good start. Specifically need to know the TQ energy goes where? dumped on the first wall and then transferred the divertor? We need to know more on how much goes on the Be-PFC as there the damage needs to be assessed. The PFC replacement requirements should be limited. RE exp. On the RE loads at ET, and modeling is good but more work is needed. Especially in view of the input for the ITER modeling: what is the energy distribution or the beam distribution profile, ….
* ELM suppression is also a high priority but not expected as fully defined for 2022.
* Question on He plasma, is it ok for ITER or not?
* 3rd Harmonic ECH validation for 1.8T operation with regard to H mode operation in PFP1.
* Low density H-mode
* ECWC for PFP1, and the diagnoses of the ECWC.
* Plasma start-up including recovery-mitigation of disruptions.
* 3D fields for ELM suppression and how to explain the density dependence. We need to benchmark the models with experiments better. We need to better understand the physics picture and characterization of the edge.

*Emmanuel Joffrin* (EJ) commented that measurement of the heat loads during a disruption event the is complicated and requires the right diagnostics which cover the whole machine. Such systems require investments! On the RE recent experiments have opened a new door. D2 injections at JET and DII-D have shown very good prospects for new experiments and WPTE is also making new contributions to these results.

*RP* commented that from ITER side the question is more on what if we cannot stop them and then what is the damage that can be caused? For example, RE experiments at WEST can give information that we have damage but not so much on the level of the damage. The postmortem analysis is needed. Also, we need to improve our models. EM forces from possible VDEs are important and the impact on the top of the machine.

*XL* asked what is the level of urgency for the ECWC, as for example JET does not have the EC? *RP* responded that the importance is on the start-up and the power threshold for ITER. We know we need 2-4MW but the data is limited and this is with a big uncertainty. If we need 4 MW or 8 MW this is a huge difference for us, and we need better understanding on the formation and the subsequent start-up. For these JET IC data is good and AUG EC Break-Down results are also vital.

*JG* asked on the He campaign at JET what is needed in terms of experiments on the L-H power threshold question? RP responded that the He from ITER side what is important to have is the impact of He plasmas in a Be-PFC machine. The sputtering of the wall ijn AUG was observed and needs to be checked also in JET. We expect higher divertor coating by sputtered Be in He plasmas than in H2 or D2 and we need to get the data on that. Also, for the ITER it is important to make a decision if we need to have only H2 plasmas or go for He plasmas for testing the ELM suppression coils. Therefore, we need to get ELMy H-mode in He and need to know the impact on the Be/W machine which only JET can answer. If then He is not ok from that respect, we need to focus on H2 plasmas for ITER and for getting to the ELMy H-mode we need more power and that would then give us the argument to request for ICRH power.

EJ presented the scientific goals for 2022 (see the related slides on the INDICO.

XL commented that links to PrIO and JET activities need to be coordinated. For example, the on the JET3 activities on neutronics we need to see how to connect the teams. Perhaps PrIO can be present at the CoTEC meetings?

JG also commented on the issue of the hand over between current JET TFLs and WPTE TFLs after October.

*Sebastijan Brezinsek* (SB) commented on the issue of limited funding for new diagnostics and those that will not be available after DTE2.

*Andreas Dinklage* (AD) commented on the progress metric that was introduced by MW during his talk. AD requested for the metric to not be used as a very restrictive means to monitor the activities and to consider as lean arrangement to follow progress in scientific outcomes.