Session 1: DEMOs and Next Step Facilities

Oral presentations:

(1-1) The EU-DEMO Exhaust Modelling Roadmap – Numerical Implementation and Methods
Presenter: Sven Wiesen

(1-2) Divertor concept development for the W7-X stellarator experiment
Presenter: Dirk Naujoks

(1-3) Utilization of SPARC to investigate divertor solutions for fusion pilot-plants
Presenter: Adam Kuang

(1-4) Physics basis and design of tungsten divertor for CFETR
Presenter: Rui Ding

(1-5) Physics drivers of the STEP divertor concept design
Presenter: Sarah Newton

(1-6) Simulation studies of He and particle exhaust in detached divertor for JA DEMO design
Presenter: Nobuyuki Asakura

(1-7) Design of the divertor and power exhaust scenarios development for the Divertor Tokamak Test facility
Presenter: Paolo Innocente

(1-8) A tightly-baffled, long-legged divertor concept for DEMO and its potential test in TCV
Presenter: Holger Reimerdes

- Power handling concepts and strategies for divertor design are updated as following,
  JA DEMO (P_{sep}: 250-300MW, P_{sep}/R: 30-35MW/m), CFETR (P_{sept}:220, P_{sep}/R: 30), EU DEMO(P_{sep}: 150, P_{sep}/R: 17), STEP (P_{sep}: 150, P_{sep}/R: 42), DTT (P_{sep}: 32, P_{sep}/R: 15), SPARC (P_{heat}:25~30?, P_{heat}/R:14-17? Smaller P_{sep}), W7-X (P_{heat}:10-20, P_{heat}/R: 1.8-3.6), TCV (P_{heat}: 1.6, P_{heat}/R: 1.8)
- Conventional single divertor, double null, advanced magnetic configuration, liquid metal are proposed.

Questions 1:

General question: Most talks of DEMO design/ next step facilities will probably show power exhaust scenario with impurity seeding. Therefore, a presentation of your baseline power exhaust scenario, including the main plasma, SOL and divertor is essential. Also, consider similarities and differences with the ITER baseline scenario with Ne/N seeding, and the techniques, design improvements and physics understanding needed to handle the higher power and fluence for DEMO or power plant level.

Questions 2:

Most talks will present design concepts and physics study result in this session. Please describe following key points from your presentation topics. This will emphasize our discussion focus and address/identify your messages to present day devices and simulation work:

a. *What physics modelling/scaling/code will be required to improve accuracies of their (power and particle handling) design and operation window,*
b. *What control issues of power and particle fluxes in the SOL/divertor are anticipated (in steady-state and during transients), and what challenges for protection of the divertor and first wall are required including available sensors and actuator.*
c. *What engineering/technology issues and challenges are most critical for their proposed conceptual designs (particularly, device size and power handling capacity).*

Questions 3:

ITER contributions: what results and confirmation of design assumptions are needed by ITER experiments and operations? Also, does your divertor design include proposed studies or designs that will contribute to the future ITER operations and divertors?