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Impact of the JET ITER-like wall on H-mode plasma fuelling

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JET ITER-like wall (ILW) experiments show that the edge density evolution is linked with the level of recycling as with increasing density a delay is observed before pedestal recovery after an ELM. Poor confinement in high-density baseline scenarios can be partially mitigated by choosing divertor plasma configurations with the strike-lines close to the divertor corners with enhanced pumping. The poloidal distribution of the ionization source and the fueling profile is more delocalized as compared to JET-C (JET with C PFCs). The H-mode pedestal fuelling cycle is dynamically influenced by plasma-wall interactions, in particular:

1. ELM induced energetic particles are kinetically reflected on W divertor PFCs leading to distributed refuelling away from the divertor depending on the divertor plasma configuration.
2. Molecular re-emission can be delayed as particles are trapped in W PFCs (bulk-W & W-coated CFCs with different fuel content), resulting in retarded recycling after an ELM due to surface outgassing effects.
3. Be is eroded from the main-chamber and migration leads to accumulation of Be deposits on the upper inner target plate. It is found that during the ELM outgassing does occur from these deposition areas leading to a localised fuelling effect on the high-field side.

Dedicated JET-ILW H-mode experiments have been executed to disentangle aforementioned effects. A direct measurement of the particle flows in the SOL is not possible in JET. The poloidal fuelling profile is derived from 2D SOLPS-ITER simulations to allow comparison of H-mode fuelling efficiency between JET-ILW and JET-C.

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Primary author: Dr WIESEN, Sven (Forschungszentrum Jülich)

Co-authors: Dr JAERVINEN, Aaro (5Lawrence Livermore National Laboratory, Livermore, CA 94550, USA); Dr MARTIN, Adriana (Laboratorio Nacional de Fusion, CIEMAT, 28040, Madrid, Spain); Dr DE LA LUNA, Elena (Laboratorio Nacional de Fusion, CIEMAT, 28040, Madrid, Spain); Dr WISCHMEIER, Marco (IPP Garching); Dr GROTH, Mathias (Aalto University); Dr BREZINSEK, Sebastijan (Forschungszentrum Jülich); Dr LOSADA, Ulises (Laboratorio Nacional de Fusion, CIEMAT, 28040, Madrid, Spain)

Presenter: Dr WIESEN, Sven (Forschungszentrum Jülich)

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