Contribution ID: **420** Type: **Oral Presentation**

# EX/9-1: Impact and Mitigation of Disruptions with the ITER-like Wall in JET

*Friday, 12 October 2012 10:45 (20 minutes)*

Disruptions are a critical issue for ITER because of the high thermal and magnetic energies that are released on short time scales, which results in extreme forces and heat loads. This contribution reports on disruption properties with the new ITER-like wall (ILW) in JET. It is shown that the material of the plasma-facing components (PFC) has significant impact on the disruption loads. The most important impact of the ILW is the absence of radiating impurities during the disruption. This has significant implications: a) low radiation during the current quench phase, b) a hot current quench plasma, c) long current decay times (often limited by vertical displacement), d) high heat loads caused by conduction of magnetic energy to PFC, e) higher halo current fractions in non-VDE disruptions.
The fraction of radiated energy has dropped from 40%-50% of the total (magnetic and thermal) energy with carbon wall to about 20% on average and even below 10% for VDE. The lack of radiation results in hot current quench plasmas of up to 1 keV and consequently long current decay times. With carbon wall about 80% of all unmitigated disruptions had a linear current quench time below 6 ms/mˆ2, whereas with the ITER-like wall only 15% are that fast and 20% have a very long current quench well above 20 ms/mˆ2. The slow current quench times facilitate vertical displacement during the current quench and the halo current fraction is increased.
The heat fluxes to first wall components have dramatically increased with the ILW, because of the low radiation. Temperatures close to the melting limit have been locally observed on upper first wall structures during deliberate VDE and even at plasma currents as low as 1.5 MA and thermal energy of about 1.5 MJ only. Local melting has been detected on these structures by regular video inspection.
A high radiation fraction can be regained by massive injection of a mixture of 10%Ar with 90%D2, ensuring a fast current quench and, by this, reducing the halo current fraction below 10%, the vertical vessel forces by up to 50% and the sideways forces virtually to zero. Because of the high radiation, the temperature of PFC stays below 400℃. Non-sustained breakdowns in the pulses following the injection of D2 mixtures as observed with carbon wall are absent with the ILW.

Work supported by EURATOM and carried out under EFDA.

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**Session Classification:** Disruptions & Post-Deadline Papers

**Track Classification:** EXS - Magnetic Confinement Experiments: Stability