

Characterising dust in JET with the new ITER-like wall

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In-vessel dust has important implications for plasma operations and safety in the tokamak environment, particularly in future long-pulse devices such as ITER. Contamination of the plasma with dust can lead to spikes in radiated power and, in extreme cases, disruptions. Large volumes of dust also present safety issues in terms of tritium retention and the potential for volatile interaction in the event of air or water ingress into a hot vessel.

The JET vessel is a challenging environment for studying and monitoring dust since physical collection is only possible during infrequent intervention periods. However, dust properties can be inferred via several remote methods, including; laser scattering from dust mobilized by disruptions, VUV spectroscopy of spikes in radiated power, and images from cameras monitoring the plasma and plasma-facing components. The results from studies utilizing these methods for JET's first operational period with the ITER-like wall are presented here. These studies aim to provide detailed quantitative information on the nature of the dust in JET; its sources, size, quantity, composition and evolution in time. Taken together, these studies provide valuable insight into the key influences on dust production and mobilization and also help to identify the origin of instability events during plasma operations. Where possible, comparisons to results from JET's carbon-wall period are made.

* See the Appendix of F. Romanelli et al., Proc. of the 24th IAEA Fusion Energy Conference 2012, San Diego, US