

Arcing at the voltage-node of the ICRH antenna vacuum transmission line at JET

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The JET A2 ICRH antennae equipped with the high-VSWR protection trip system demonstrate sufficient robustness with respect to high voltage arcing and voltages of $\geq 35\text{kV}$ are routinely achievable during operations. There is growing evidence however that low-VSWR arcs, in particular those which occur near the voltage node of the antenna vacuum transmission line (VTL) pose a substantial threat to the system. In 2004 the voltage-node arcing caused a perforation in a VTL bellow, leading to a JET vacuum leak. Signs of low-VSWR arcing were also observed during commissioning of the ELM-tolerant 3dB splitter system which resulted in restriction of its operational capabilities. The absence of reliable detection methods for the voltage-node arcs makes the problem particularly difficult at JET and worrisome for ITER. The experimental evidence of arcing will be presented together with relevant simulations of the RF system response. A plausible mechanism of triggering the low-voltage arcs by a multipactor-sustained discharge in presence of big electrode gaps will be discussed and possible arc detection methods will be outlined.

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