Abstract

A simple model to quantify source and sink terms of dust observed in tokamaks using fast visible imaging is presented. During neutral beam injection (NBI), dust appearance rates increase in front of the neutral beam port by up to a factor of 5. The images show dust streaming from the port box as previously settled dust becomes mobilized during beam injection. Following an oxygen bake and vent, the dust observation rate is a factor of 2 lower than that after a vessel entry vent with no oxygen bake. Detected dust levels decay on a shot-to-shot basis in a roughly exponential fashion, with a decay time of approximately 20 sec of plasma exposure. Appearance rates of dust mass are estimated using assumed lognormal and power law functional forms for the dust size distribution. The two dust size distributions differ significantly on the amount the dust material carried by the largest particles, highlighting the need for further dust studies in order to make accurate forecasts to ITER.

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