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In-Vessel Dust Velocity Correlated with the Toroidal Rotation of the Plasma

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We present the in-vessel dust velocity distribution and its correlation with toroidal rotation of plasma. Main diagnostic for the dust monitoring is visible CCD cameras and toroidal rotation of plasma is measured by charge exchange spectroscopy (CES).

4129 dust trajectories (1237 dusts in 2010 campaign, 1821 dusts in 2011 campaign, 1071 dusts in 2012 campaign) were analyzed. The dust velocity distributions in three campaigns are well described by lognormal distribution function, and they are in a broad range from 7 to 461 m/s with the peaks at 30 m/s (2010), 34 m/s (2011), and at 46 m/s (2012). This is related to the increase of NBI input power level, since most of KSTAR plasmas are NBI driven ones. As the NBI input power increases (Ohmic, L-, and H-mode), the peak velocity and the high velocity tail increase. It is found that the dust velocity is strongly correlated with normalized stored energy (w/I_p), similar to the Rice scaling.

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