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**Non-linear structure formation in strongly coupled dusty plasma flow past an obstacle**[1] YOSHIKO BAILUNG, HEREMBA BAILUNG, JOYANTI CHUTIA, Institute of Advanced Study in Science and Technology — A novel device has been designed to study a dusty plasma fluid flow past an obstacle (a dust void) immersed (created) in a stationary dusty plasma medium. In most experiments, dust flows are induced either by neutral gas flow variation or by change in electric potential. We have studied the transition from laminar to turbulent flow dynamics behind the dust void by controlling the dust flow speed. Experiment is performed in an RF discharge plasma mixed with dust grains of 5 micron diameter. The dusty plasma flow is sustained for a few seconds and the velocity is controllable in a variable range $\sim 0 - 30 cm/sec$. The Reynolds number associated with the flow is measured from the kinematic viscosity parameter of the medium. We report on the first observation of a counter rotating vortex pair behind a dust void when the Reynolds number is $\sim 130 < Re < 250$. The non-rigid nature of the obstacle and unique viscous property of the dusty plasma fluid play the crucial role in structure formation. In absence of the stationary dusty plasma fluid, a supersonic dust flow (Mach number>1) generates bow shock in the upstream region of the obstacle.

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