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Dynamics of the self organized toroidal dust flow structures in plasma DEVENDRA SHARMA, MANJIT KAUR, PRABAL KUMAR CHATTOPADHYAY, J. GHOSH, Y.C. SAXENA, Institute for Plasma Research — The self-organized dynamical flow pattern of the dust cloud forming a toroidal structure in an unmagnetized glow discharge plasma is shown to result from a shear driven instability of the dust cloud. A condensed phase of the levitated dust cloud shows a steady rotation below the instability threshold. Crossing the threshold sets in the melting of the condensed state which saturates by forming a hollow toroidal dust flow structure. An analytical formulation is presented and characterized in order to model the dynamics of such self-organized dusty structures.

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