Abstract Submitted for the DFD06 Meeting of The American Physical Society

Free surface deformation of dry sand in hollow spinning cones ROCIO CHICHARRO, CESAR TREVIÑO, FCUNAM, ABRAHAM MEDINA, ES-IME Azcapotzalco, FRANCISCO J. HIGUERA, ETSI-Aeronauticos Univ. Politec. Madrid — In this work we have studied the free surface deformation of dry sand in hollow inverted conical cylinders which rotate axisymmetrically respect to the vertical axis. In these systems we show theoretically and experimentally that, for dimensionless angular velocities slightly above a critical Froude number, Fr,  $(Fr=w^2L/g;f$ where w is the angular velocity, L is a length measured from the apex, g is the gravity acceleration and f is the friction coefficient), the rotation deforms the free granular surface but at higher rates the grains themselves are expelled outside the cones as spiral jets. Conditions for the occurrence of the ejection of a single grain also will be discussed.

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Date submitted: 07 Aug 2006

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