Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Surface melting of wet granular matter in two dimensions CHRISTOPHER MAY, KAI HUANG, INGO REHBERG, Experimentalphysik V, Universität Bayreuth, 95440 Bayreuth, Germany — The transition from the solidlike to the liquidlike state of a monolayer of wet glass beads under horizontally swirling motion is investigated experimentally. Due to the cohesion arising from the formation of capillary bridges, the wet particles initially form a crystal like structure at moderate driving. As the driving frequency increases, this structure is found to melt with two steps: A rearrangement into a hexagonal packing sheltered by a premelted layer, followed by a melting from the surface. This process is characterized by means of Voronoi tessellation and bond orientational order parameters, and discussed within the scenario of KTHNY theory that accounts for crystal melting in two dimensions.

Kai Huang
Experimentalphysik V, Universität Bayreuth, 95440 Bayreuth, Germany

Date submitted: 07 Dec 2011 Electronic form version 1.4