Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

High-velocity drag friction in dense granular media[1] YUKA TAKEHARA, KO OKUMURA, Department of Physics, Graduate school of Ochanomizu University — We study drag force acting on an obstacle in granular media, focusing on a high-velocity region where only a few direct studies are available. The granular media are two-dimensional and consist of small-sphere particles. A larger-disk obstacle moves in the medium at different constant speeds. The drag force is found to be proportional to the square of the velocity. This clear experimental relation is convincingly explained by a simple and original theory. A crucial assumption of this theory is supported by image analysis for the size of the cluster of grains around the disk. As a result, we conclude that the friction we observed here is physically different from a hydrodynamic inertial friction, which has been discussed in dilute granular flows and in impact experiments. Furthermore we demonstrate how the drag force depends on packing fraction to discuss the possibility of a dynamical jamming transition in our drag experiment.

[1] Y.Takehara, S. Fujimoto and K. Okumura, High-velocity drag friction in dense granular media, *EPL*, **92** (2010) 44003

[1]We thank S. Fujimoto for her contribution at the early stage of this work.

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Date submitted: 12 Aug 2011 Electronic form version 1.4