

Abstract Submitted
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High-velocity drag friction in granular media near the jamming point¹ YUKA TAKEHARA, KO OKUMURA, Ochanomizu University — Drag friction that acts on a disk in a two-dimensional granular medium is studied at high packing fractions in a closed horizontal cell used in Ref. [1]. We concentrate on a high-velocity region, in which the dynamic component of the force, obtained as average of strongly fluctuating force, clearly scales with velocity squared. We change the packing fraction to experimentally access the rheology near the jamming point and we find that the dynamic force and fluctuation of the force tend to diverge as the packing fraction approaches the jamming point. This is in contrast with the case of soft colloids in which the stress is finite at the jamming point. In addition, we develop a simple theory, which takes into account a collective collision around the disk and is equipped with a length scale diverging towards the jamming point. This theory explains well the experimental data. Unexpectedly, the static component of the force, the total force and the fluctuation of the total force also diverge towards the jamming point, with virtually the same exponent.

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

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