Experiments in granular gases, as a NESS thermostat.

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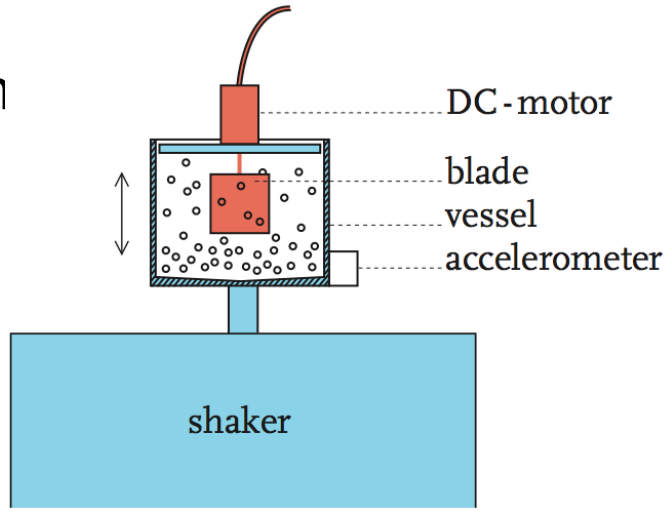
Replica of Brownian object, at cm-scale:

a rotator is immersed in **granular gas**, taken as an archetype of **NESS**.

A DC motor is astutely used as **actuator**

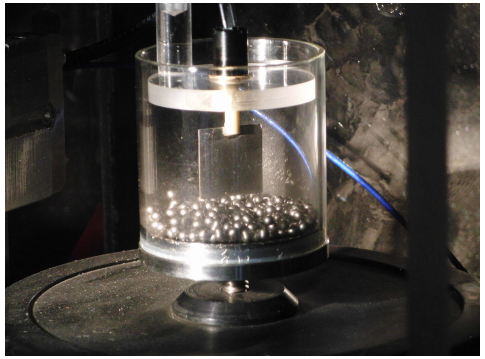
and sensor simultaneously.

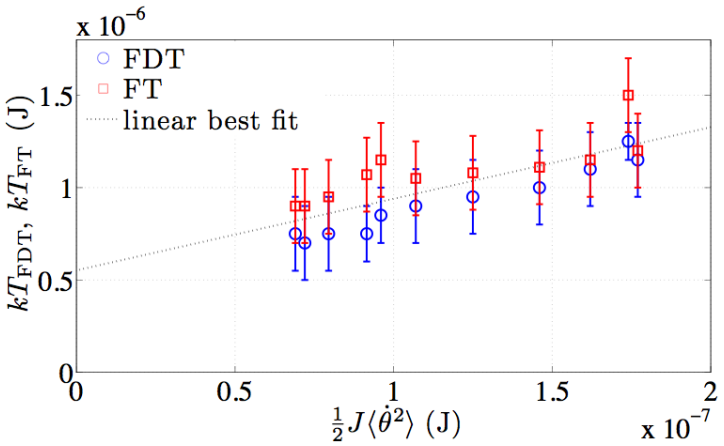
Allows to impose torque, measure velocity.
→ measurement of temperature...



What temperature?

– 2 consistent ways to define / measure effective <u>temperature</u>: thanks to **F**luctuation-**D**issipation **T**heorem, and **F**luctuation **T**heorem. (Agree to about 10%.)





– Our device behaves <u>as a **thermometer**</u>...

however <u>out-of-equilibrium</u>!

– μ and D for various densities,

– transport between 2 such systems at different $kT_{eff.}$ or densities

Like expected for equilibrium systems.

– However with **<u>huge</u> $kT_{eff.}$**: $kT_{eff.} \sim 10^{-7}$ J !... (→ *easy* to measure...)

→ **Convenient and versatile system**

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