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(G*) Dynamics of an intruder moving through a two-dimensional granular medium

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Granular systems can be great analogies to the molecular structures of materials and introducing an intruder to the system can provide novel insight into their dynamics. Here, we study the response of a disordered bi-disperse two-dimensional aggregate of oil droplets to a moving ferrofluid droplet which acts as a controlled intruder. The frictionless and cohesive oil droplets form a compact two dimensional disordered aggregate. The mobile ferrofluid droplet is controlled with a localised magnetic field and as the intruder is moved through the aggregate, the intruder forces rearrangements within the aggregate. The speed of the intruder, disorder of the 2D aggregate, and the adhesion between the oil droplets is controlled, and we probe the extent of the rearrangements caused by the intruder as it moves through the aggregate.

Keyword-1

Granular Glass

Keyword-2

Cooperative Rearrangements

Keyword-3

Intruder

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