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Stochastic jetting and dripping in confined soft granular flows

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We report new dynamical modes in confined soft granular flows, such as stochastic jetting and dripping, with no counterpart in continuum viscous fluids. The new modes emerge from an avalanche-like dynamics of a close-packed monodisperse emulsion entering a narrow orifice. We observe formation of remarkably stable single-file granular jets which occasionally break resulting in non-Gaussian distribution of cluster sizes. We find that the sequences of droplet rearrangements that lead to the formation of such chains resemble unfolding of cancer cell clusters in narrow capillaries, overall demonstrating that the microfluidic emulsion systems could serve to model certain aspects of tissue dynamics.

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