

Abstract Submitted
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Dislocations jam at any density¹ GEORGIOS TSEKENIS, NIGEL GOLDENFELD, KARIN DAHMEN, University of Illinois at Urbana-Champaign — Crystalline materials deform in an intermittent way via dislocation-slip avalanches. Below a critical stress, the dislocations are jammed due to long-range interactions and the material exhibits plastic response, while above this critical stress the dislocations are mobile (the unjammed phase) and the material fails. We use dislocation dynamics and scaling arguments to show that the critical stress grows with the square root of the dislocation density. Consequently, dislocations jam at any density, in contrast to granular materials, which only jam below a critical density.

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