

Abstract Submitted
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Transverse Instability of Granular Avalanches¹ IGOR ARANSON, Argonne National Laboratory, FLORENT MALLOGGI, ERIC CLEMENT, ESPCI, Paris, France — Recent experiments with dry and underwater avalanches revealed a surprising new phenomenon: transverse instability and fingering of avalanche front propagating on erodible granular substrate. In order to describe this phenomenon we applied order parameter model of partially fluidized granular flows which was successfully tested on downhill and triangular avalanches in thin granular layers. In the framework of our model we obtained a family of “solitary” front solutions with the velocity and the height of the front determined by the depth of erodible substrate, the inclination angle, and fronts total mass. We have found that the front exhibits transverse instability in the certain range of substrate depth and inclination angles, in good agreement with the experiment. The primary mechanism of the transverse instability is related to the dependence of the front velocity on the mass of granular material it carries, and is not triggered by the granular size segregation

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