



Granular Patterns

Igor Aranson, Lev Tsimring

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This book is a systematic introduction to a new and exciting field of patterns in granular matter. Granular materials are collections of discrete macroscopic solid grains with a typical size large enough that thermal fluctuations are negligible. Despite this seeming simplicity, properties of granular materials are different from conventional solids, liquids and gases due to the dissipative and highly nonlinear nature of forces among grains. The last decade has seen an explosion of interest to nonequilibrium phenomena in granular matter among physicists, both on the experimental and theoretical side. Among these phenomena, one of the most interesting is the ability of granular matter upon mechanical excitation to form highly ordered patterns such as ripples, avalanches, or bands of segregated materials. This book presents a comprehensive review of experiments and novel theoretical concepts needed to understand the mechanisms of pattern formation in granular materials. This book is written for experienced physicists interested in this new rapidly developing field, as well as young researchers and graduate students entering this field. We hope that both experimentalists and theorists already working in the field will find it useful.

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