Bulletin of the American Physical Society

APS March Meeting 2021
Volume 66, Number 1
Monday–Friday, March 15–19, 2021; Virtual; Time Zone: Central Daylight Time, USA

Session M16: Collective Behavior in Driven Granular Media
11:30 AM–1:54 PM, Wednesday, March 17, 2021

Abstract: M16.00010 : New parameters to characterize the nematic transition for rods deposition on 2D lattices*
1:42 PM–1:54 PM Live

← *Abstract*

Presenter:
  Eugenio Vogel
    (Physics, Univ de La Frontera)

Authors:
  Eugenio Vogel
    (Physics, Univ de La Frontera)

  Gonzalo Saravia
    (Physics, Univ de La Frontera)

  Antonio Ramirez-Pastor
    (Physics, Univ. Nac. San Luis)

  Marcelo Pasinetti
    (Physics, Univ. Nac. San Luis)

We tackle the problem of excluded volume deposition of rigid rods of length k unit cells over square lattices. Two new features are introduced: a) two new short-distance complementary order parameters (called Π and Σ) are defined, used and discussed to deal with the phases present as coverage increases; b) the interpretation is now done beginning at the high-coverage locally ordered phase (present regardless of the k value) which allows to interpret the low coverage nematic phase as an ergodicity breakdown present for $k \geq 7$. In addition data analysis is now done by a combination of mutability (dynamical information theory method) and Shannon entropy (static distribution analysis). Moreover, a comparison between mutability and Shannon entropy is done reporting their advantages and disadvantages for dealing with this problem. Parameter Π turns out to better characterize this system through the entire parameter space.