

Abstract Submitted  
for the DFD20 Meeting of  
The American Physical Society

**On the Visualization of Localized Porous Media deformation during an Indentation Process**<sup>1</sup> QIFU WANG, QIUYUN WANG, ZENGHAO ZHU, GANG FENG, QIANHONG WU, villanova univerisity, CELLULAR BIOMECHANICS AND SPORTS SCIENCE LABORATORY TEAM — A novel experimental setup was developed to systematically examine the localized densification of a porous foam under indentation, from which the local Darcy Permeability of the porous foam is obtained. The experimental setup consists of a Physik instrument (PI) positioning system and a square flat-punch tip on an isolated optical table. The polyester foam was compressed using indenters of different sizes. Its deformation was precisely captured by a high-speed camera. The results were processed with Digital Image Correlation (DIC). It shows that the densification of the porous foam, which is related to the collapse of the pores, occurs at the vicinity near the solid loading surface and propagates as the indentation proceeds. The porosity of the porous foam due to the densification effect was determined, from which one obtained the spatial-temporal distribution of the Darcy permeability of the porous media. The study presented herein, combining a novel indentation system and a comprehensive analysis of the recorded footage, precisely captures the detailed non-uniform compression of a thin porous layer under indentation, will have a significant impact on the study of transport through soft matters.

<sup>1</sup>NSF CBET FLuid Dynamics Program under Award Number 1511096

Qifu Wang  
villanova univerisity

Date submitted: 02 Aug 2020

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