

Abstract Submitted  
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**Highly nonlinear dynamics in 1D granular metamaterials:  
anomalous interaction of solitary waves with interfaces<sup>1</sup>** CHIARA DARAIO,  
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HERBOLD, Mechanical and Aerospace Engineering Department, University of Cal-  
ifornia, San Diego — One dimensional chains of uniform beads support the formation  
and propagation of a new type of highly nonlinear solitary waves with compact sup-  
port. The interaction of these solitary waves with an interface between two strongly  
nonlinear discrete granular media results in novel dynamic phenomena. Here we  
present a detailed study of the behavior of the reflected and transmitted waves at  
the interface between two media composed of spherical beads with dramatically  
different elastic properties and the influence of the static precompression on their  
formation and propagation. The presence of static precompression can be effectively  
utilized to monitor the information flow through the interfaces. The formation of  
anomalous waves caused by the selective ability of the media to support compressive  
or rarefaction stationary pulses is presented for interfaces of various materials and  
investigated numerically and experimentally.

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