

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Revealing the structure of a granular medium through acoustic measurements**<sup>1</sup> RAMON PLANET LATORRE, SÉBASTIEN LHERMINIER, GILLES SIMON, LOIC VANEL, OSVANNY RAMOS, Laboratoire PMCN Université Claude Bernard Lyon 1 — An array of acoustic sensors records the sound that has travelled across a bi-dimensional granular medium, consisting of photoelastic discs, which are confined between two transparent plates and arranged into different crystalline or disordered structures. The system is compressed along one direction (either force-controlled or displacement-controlled) and can be sheared in the direction perpendicular to the applied force; while the acoustic signals are generated through a well-controlled and local mechanical excitation. The results show power-law regimes in the force vs. sound speed relation, with exponents that are sensitive to the structure of the packing. Small structural changes are also detectable which, in principle, can be used to predict large avalanches during the slow shearing of the system.

<sup>1</sup>Financial supports for this work from AXA Research Fund.

Ramon Planet Latorre  
Laboratoire PMCN Université Claude Bernard Lyon 1

Date submitted: 19 Dec 2012

Electronic form version 1.4