

## **ACOUSTICS2008/906**

### **Acoustic waves propagation along mechanically free surface of unconsolidated granular porous media**

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Unconsolidated granular materials exhibit strong dependence of elastic properties on pressure due to high sensitivity of the inter-grain contacts to magnitude of loading. As a consequence the gravity field makes these granular assemblages highly elastically inhomogeneous particularly near mechanically free surface. Theoretical and experimental investigations conducted recently have demonstrated that multiple wave-guide surface acoustic modes propagate along the free surface of the solid-state skeleton in the disordered air-saturated granular packings. These modes are localized near the surface. In ordered granular packing the acoustic waves can travel along the surface inside the horizontal channels, which are localized beneath the surface. The waves of different frequencies are travelling at different depths. The anisotropy of these inhomogeneous granular phononic crystals has an important influence of the existence of the wave-guide modes. The experiments with acoustic waves travelling in the vicinity of a free surface provide fundamental information on the mechanical behaviour of unconsolidated granular media at very low pressures in the vicinity of the jamming transition. The perspectives of this research could be related to the analysis of the role which could be played in the considered phenomena by the acoustic waves predominantly travelling in these granular porous assemblages through the fluid-saturated pores.