

LadHyX Seminar – June 6, 10:45

Finn Box
(U. Manchester)

The fast and the flexible: dynamic buckling of elastic sheets

The wrinkling of thin elastic objects provides a means of generating regular patterning at small scales. Static wrinkle patterns are known to be governed by an energetic balance between the object's bending stiffness and an effective substrate stiffness. This seminar will focus on dynamic wrinkling, induced by the impact of a solid sphere onto an ultra-thin polymer sheet floating on water. The vertical deflection of the sheet's centre draws material radially inwards, resulting in an azimuthal compression that is relieved by the wrinkling of the entire sheet. This wrinkling is truly dynamic, exhibiting features that are qualitatively different to those seen in quasi-static wrinkling experiments. In this case, the wrinkles coarsen dynamically because of the inhibiting effect of the fluid inertia. If we remove the underlying fluid, does inertia still play a role?