



ESPCI  
Laboratoire PMMH  
10 rue Vauquelin, 75231 Paris Cedex 05



## Séminaire PMMH

*Salle de réunion du PMMH, Campus Jussieu, Bâtiment Cassan A, 1<sup>er</sup> étage*

*Vendredi 21 décembre 2018, 11h00-12h00*

### Emmanuel Viot

EPFL-Harvard University

#### Non-destructive prediction of the buckling load of soda cans and space rockets

What is the critical load required to crush a soda can or a space rocket shell? Surprisingly, there is no good way to estimate it, because of the high defect-sensitivity of the buckling instability. Here we measure the response of (imperfect) empty Coca-Cola cans to lateral poking and identify a generic stability landscape, which fully characterizes the stability of real imperfect shells in the case where one single defect dominates. We show that the landscape of stability is independent of the loading protocol and the poker geometry.

Our results suggest that the complex stability of shells reduces to a low dimensional description and that tracking the ridge and the valley of the landscape of stability defines natural coordinates for describing the stability of shells. By using this new paradigm, we show that we can accurately and non-destructively predict the buckling load of real imperfect shell structures, thereby promising drastic reductions of the costs of structural engineering experimental tests.



**Attention : pas de séminaire les semaines à venir : bonnes fêtes !**

Prochain séminaire : vendredi 11 janvier 2019, Bernadette Bensaude-Vincent (Univ. Paris 1)

Programme des séminaires : [www.pmmh.espci.fr](http://www.pmmh.espci.fr), onglet *Séminaires PMMH*

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