

# Séminaire LIONS

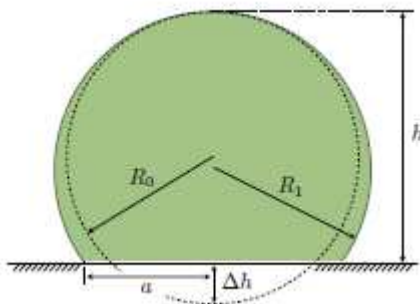


***Jeudi 14 novembre 2013 à 11h00, pce. 157, bât. 125***

**From adhesion to wetting of a soft particle**

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Since the seminal works of Hertz, Johnson, Kendall, and Roberts (JKR), and Derjaguin, Muller, and Toporov (DMT), the contact of adhesive elastic solids has been widely studied. This area of research is of tremendous importance : the range of application now spreads from biology to engineering, as shown by the recent developments on latex particles, biological cells or micro-patterned substrates, to name a few. Using a thermodynamical approach [1], we calculate the adhesion-induced deformation of a spherical elastic particle placed on a rigid substrate, under zero external load, and including an ingredient of importance in soft matter : the interfacial tension of the cap. First, we limit the study to small deformation. In contrast with previous works, we obtain an expression for the free energy that precisely contains the JKR and Young-Dupr!!e asymptotic regimes, and which establishes a continuous bridge between them. Then, we consider the large deformation case, which is relevant for future comparison with numerical simulations and experiments on very soft materials. Using a fruitful analogy with fracture mechanics, we derive the free energy of the problem and thus obtain the equilibrium state for any given choice of physical parameters.

[1] T. Salez, M. Benzaquen, E. Rapha el, *Soft Matter* DOI :10.1039/C3SM51780B (2013)