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Surface tension effects in soft composites

Tuesday 17 June 2014 16:30 (30 minutes)

Solid surface tension is typically ignored, but can be very important in soft solids. It acts to minimise surface area, and can significantly change how the solids behave. I will talk about its role in determining the mechanical properties of soft composites. We make soft composites by embedding small inclusions in soft gels - with the aim of understanding how the composite microstructure controls is mechanical properties. Classical theory for composite behaviour works when the inclusions are sufficiently large, but below a critical lengthscale, it breaks down: surprisingly, making small holes in a soft material can actually stiffen, rather than soften the material. I will demonstrate how these strange effects are caused by solid surface tension.

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