

The mechanics of soft composites

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Abstract:

Many natural materials are soft composites, and these often have material properties that far exceed those of their synthetic counterparts. To understand this, we fabricate soft composites comprised of soft gels with colloidal inclusions via two techniques – firstly by polymerizing emulsions, and secondly by a novel cavitation technique. We find that the soft composites have several unexpected properties. For example, liquid inclusions can actually rigidify soft gels (due to the influence of solid surface tension). I'll also show how our new cavitation technique can be used to easily fabricate model soft composites with a well-defined microstructure.