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Comparing Fluid and Elastic Block Copolymer Shells DAMITH ROZAIRO, ANDREW B. CROLL, Department of Physics, North Dakota State University — Emulsions can be stabilized with the addition of an amphiphilic diblock copolymer, resulting in droplets surrounded and protected by a polymer monolayer. Such droplets show considerable promise as advanced cargo carriers in pharmaceuticals or cosmetics due to their strength and responsiveness. Diblock copolymer interfaces remain mostly fluid and may not be able to attain the mechanical performance desired by industry. To strengthen block copolymer emulsion droplets we have developed a novel method for creating thin elastic shells using polystyrene-b-poly(acrylic acid)-b-polystyrene (PS-PAA-PS). Characterization of the fluid filled elastic shells is difficult with traditional means which lead us to develop a new and general method of mechanical measurement. Specifically, we use laser scanning confocal microscopy to achieve a high resolution measure of the deformation of soft spheres under the influence of gravity. To prove the resilience of the technique we examine both a polystyrene-b-poly(ethylene oxide) (PS-PEO) stabilized emulsion and the PS-PAA-PS emulsion. The mechanical measurement allows the physics of the polymer at the interface to be examined, which will ultimately lead to the rational development of these technologies.

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