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**Changing shape of elastic shells via electrostatic interactions<sup>1</sup>**

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Northwestern University — Shape plays a key role in the design of synthetic structures such as biomimetic red blood cells, metallic nanocontainers and colloidal building blocks for self-assembly. It is therefore crucial to enhance our current capabilities to synthesize membranes of desired shapes with precision and provide a simple procedure to induce shape modifications. We show that Coulomb interactions can be used as a tool for designing and manipulating shapes of soft elastic shells at the nanoscale. We investigate the minimal-energy conformations of charged, elastic nanoshells subject to the constraint of fixed total volume for a wide range of electrostatic and elastic parameters. We find that the shape of the shell changes when we decrease the electrolyte concentration in the surrounding environment or increase the total charge on the shell surface. We obtain a variety of smooth shapes that include ellipsoids, discs, and bowls. A discussion on the possible origins of these shapes and related procedures to induce shape deformations is also provided.

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