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Conformation of charged vesicles: the Debye Huckel and the low curvature limit KUMARI PRITI SINHA, PROF. ROCHISH M THAOKAR, Indian Inst of Tech-Bombay — The shape as well as tension and pressure inside an uncharged vesicle are determined by the reduced volume. These parameters are important for a vesicle or a biological cell, since it can affect bio-physical processes such as osmosis and permeation, interaction with external agents such as bio- macromolecules and thermal fluctuations of the bilayer membrane of a vesicle. Charged membranes are ubiquitous in nature, most biological cell bio-membranes are charged, and therefore the knowledge of shape, tension and pressure of charged vesicles is critical. Additionally, the distribution of charges in the inner and outer leaflets is also important as it can affect the spatial interaction of a bilayer membrane with proteins. This work addresses these issues in the low charge and curvature limit. Our analysis indicates that despite a very strong two-way coupling between the charge and the curvature, the shapes of charged vesicles remain similar to that of uncharged vesicles at comparable reduced volumes, even for reasonable values of total charge. However, the tension and pressure values are higher, and are accurately estimated. Similarly the charge distribution on the outer and inner leaflet is strongly affected by the curvature. The value of spontaneous curvature due to charge redistribution is estimated. The insensitivity of the shape to charges persists even when only the outer leaflet is charged instead of charged inner and outer leaflets

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