

# A MODEL FOR LIPID MEMBRANES WITH TILT AND DISTENSION BASED ON THREE-DIMENSIONAL LIQUID CRYSTAL THEORY

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The relationship between the two-dimensional theory of tilted lipid membranes and three-dimensional liquid crystal theory is discussed in detail. The latter framework furnishes an appropriate foundation for membrane theory and facilitates a straightforward reduction to a well-posed two-dimensional model. This emerges as a special case of the Cosserat theory of elastic shells and incorporates a model of generalized capillarity in which the membrane energy responds to surface curvature and also to surface dilation and its gradient.