The Mechanics of Non-Euclidean Plates in Synthetic and Natural Sheets

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Thin elastic flat plates attain non-trivial configurations when they are confined. I will show that plates with intrinsic non-Euclidean geometry attain multi scale three-dimensional configurations even when they are free of external loading. Such bodies do not have any stress-free configuration, thus current plate theories cannot properly describe their physics. I will present our recent experimental results and our theoretical model for the shaping principles of such plates. Finally, I will show how these principles are manifested during the growth of leaves.