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Geometry of Thin Nematic Elastomer Sheets HILLEL AHARONI, Univ of Pennsylvania, ERAN SHARON, RAZ KUPFERMAN, Hebrew University of Jerusalem — A thin sheet of nematic elastomer attains 3D configurations depending on the nematic director field upon heating. In this talk we describe the intrinsic geometry of such a sheet, and derive an expression for the metric induced by general smooth nematic director fields. Furthermore, we investigate the reverse problem of constructing a director field that induces a specified 2D geometry. We provide an explicit analytical recipe for constructing any surface of revolution using this method. We demonstrate how the design of an arbitrary 2D geometry is accessible using approximate numerical methods.

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