Nematic elastomer ribbons

Virginia Agostiniani[(1)], **and Antonio DeSimone**[(1)]

(1) SISSA, Italy

In this talk, we present a plate model describing the bending behavior of nematic elastomer thin films where the orientation of the nematic director along the thickness has a *twisted* geometry and the typical appearance of the minimal energy configurations is that of wide ribbons. The reduced energy functional is derived from a three-dimensional description of the system using rigorous dimension-reduction techniques. As a result, the (new) two-dimensional model is a nonlinear plate theory in which deviations from a characteristic target curvature tensor cost elastic energy. Moreover, the stored energy functional cannot be minimised to zero, thus revealing the presence of residual stresses, as observed experimentally and in numerical simulations.