Glassy correlations in nematic elastomers BING LU, PAUL GOLD-
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of Pennsylvania — We address the physical properties of an isotropic melt or so-
lution of nematogenic polymers that is then cross-linked beyond the vulcanization
point. To do this, we construct a replica Landau theory involving a coupled pair of
order- parameter fields: one describing vulcanization, the other describing local ne-
matic order. Thermal nematic fluctuations, present at the time of cross-linking, are
trapped by cross- linking into the vulcanized network. The resulting glassy nematic
fluctuations are analyzed in the Gaussian approximation in two regimes. When the
localization length is shorter than the thermal nematic correlation length, the ne-
matic correlations are well captured as glassy correlations. In the opposite regime,
fluctuations in the positions of the localized polymers partially wash out the glassy
nematic correlations.

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