

# Regularity and eigenvalue properties of minimizers for Maier—Saupe energies in liquid crystals

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We investigate regularity and properties of eigenvalues for minimizers of the Maier—Saupe energy used to characterize nematic liquid crystal configurations. The energy density is singular, as in Ball and Mujumdar’s modification of the Landau—de Gennes Q—tensor model, so as to constrain the competing states to take values pointwise-almost everywhere in the closure of a physically realistic range. We prove that minimizers are regular and in several model problems we use this regularity to prove that minimizers take on values strictly within the physical range.

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