Variational Models of Soft Matter
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A Q-tensor model for electrokinetics in nematic liquid crystals

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I will describe a mathematical model for nematic electrolytes, in which the liquid crystalline component is described in terms of a second-rank order tensor. The model is based on a variational principle and extends the previously developed director-based theory to account for presence of disclinations and possible biaxiality. I will also present several simple but illustrative examples of liquid crystal-enabled electro-osmotic flows around a stationary colloidal particle in a nematic electrolyte. The simulations show a strong dependence on the director configurations and on the anisotropies of dielectric permittivity and electric conductivity of the nematic.

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