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Weak anchoring around a colloidal particle

In the mathematics of liquid crystals, we study minimizers of the Landau-de Gennes energy in $\mathbb{R}^3 \setminus B_1(0)$ with external magnetic field in the large particle limit. We impose weak surface anchoring on the boundary and derive a lower bound for the energy in terms of the optimal boundary condition. We also conjecture about what these optimal boundary conditions look like for a few different cases of weak anchoring.