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On Minimizing Harmonic Maps with Planar Boundary Anchoring

Motivated by experiments with nematic liquid crystal droplets, we study harmonic maps that arise as minimizers of the the one-constant approximation of the Osee-Frank energy subject to strong anchoring tangential boundary condition. In this talk, I will present a reflection method allowing us to analyze the regularity of minimizers up to the boundary. We also obtain results on the type and location of defects that can occur, such as boundary "boojums" and interior vortices. The talk is based on joint work with L. Bronsard and A. Colinet.