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Minimality and stability of the ball in the liquid drop model with screened interactions

I will present on the volume-constrained minimization of a functional given the sum of the perimeter functional and a nonlocal repulsive term defined through the Yukawa kernel. In this functional the competition between surface tension and repulsion is governed by two independent quantities: the screening rate and the volume. For this problem, above an explicit critical screening rate, minimizers exist at every volume, and below an explicit volume threshold minimizers exist for every screening rate. Moreover at small volume the ball is the unique minimizer up to translation, uniformly in the screening rate. Finally, there exists a sharp volume threshold, depending on the screening rate, for the ball to be a stable volume-constrained critical point. This is a joint work with Lia Bronsard and Kenneth DeMason.