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Stability and index estimates of capillary surfaces

In this talk, we will discuss stability and index estimates for compact and noncompact capillary surfaces. A classical result in minimal surface theory says that a stable complete minimal surface in \mathbb{R}^3 must be a plane. We show that, under certain curvature assumptions, a strongly stable capillary surface in a 3-manifold with boundary has only three possible topological configurations. In particular, we prove that a strongly stable capillary surface in a half-space of \mathbb{R}^3 which is minimal or has the contact angle less than or equal to $\pi/2$ must be a half-plane. We also give index estimates for compact capillary surfaces in 3-manifolds by using harmonic one-forms. This is joint work with Aiex and Saturnino.