1021-53-246 **Ben Stephens*** (stephens@math.toronto.edu), Department of Mathematics, University of Toronto, Toronto, Ontario M5S 2E4. *Thread-wire Surfaces.*

Alt's Thread Problem concerns surfaces in R^3 which minimize area, subject to a fixed boundary ("wire") and to a free boundary ("thread") with length constraint. Alt minimizers typically consist of separate surface components with corners where the thread pulls away from the wire. I show that Alt minimizers lying near a generic wire are C^1 near such corners. Moreover, they satisfy a very nice property: the normals to the surface converge to the Frenet binormal of the wire at the surface's corner point. This shows that at the C^1 level, local wire geometry dominates global wire geometry in influencing the surface corner. Moreover, nearby the Gauss map is injective. Also, surface components of near-wire minimizers appear only near maxima of wire curvature. This suggests an approach to showing that Alt minimizers on generic wires have finitely many surface components. For videos of related physical experiments, see www.bkstephens.net. (Received September 11, 2006)