1056-58-1965   **John Luecke*** (`luecke@math.utexas.edu`), University of Texas at Austin, Mathematics Department, 1 University Station C1200, Austin, TX 78712-0257, and **Isabel Darcy** and **Mariel Vazquez**. *Analysis of difference topology experiments on a Protein-DNA complex.*

Biologists Pathania, Jayaram, and Harshey developed an experimental technique, difference topology, for analyzing the structure of a protein-DNA complex, the mu transpososome. Deducing the shape of the complex from the experimental results presents an interesting knot theoretic problem. In particular, the three strands of DNA in the complex are thought of as a 3-string tangle in a ball, and we seek those tangles consistent with the experimental results. We characterize such "solution tangles" by certain knotted graphs. By investigating planarity conditions on these graphs, we show that the only rational tangle solution, and the only solution with small crossing number, is that deduced by Pathania, Jayaram, and Harshey. That is, though there are other possible solutions, there is a unique one that is biologically relevant. (Received September 22, 2009)