This talk will describe joint work with Matt Hedden and Paul Kirk. We define an elementary relatively \( \mathbb{Z}/4 \) graded Lagrangian-Floer chain complex for a particular class of 1-manifolds in the pillowcase. Given an appropriate 2-tangle decomposition of a knot, the traceless \( SU(2) \) character varieties of the tangles give rise to Lagrangian submanifolds in the pillowcase of traceless representations for the splitting surface. The Lagrangian-Floer chain complex is then generated by intersections that correspond to the generators of Kronheimer and Mrowka’s singular instanton chain complex for the knot. We provide evidence to support an Atiyah-Floer conjecture relating these two Floer homology theories. (Received September 03, 2014)