1099-76-135   **De Witt L Sumners*** (`sumners@math.fsu.edu`), Department of Mathematics, 1017 Academic Way, Tallahassee, FL 32306. *Conservation of Writhe and Helicity Under Reconnection.*

Reconnection is a fundamental event in many areas of science, including interaction of fluid vortices and flux tubes in fluid mechanics and magnetohydronamics, and site-specific recombination in DNA. The helicity of a flux tube is a measure of knotting and linking of field lines in the tube, and the absolute value of the helicity is a lower bound for the energy. A theorem of Moffatt and Ricca computes the helicity (a lower bound for energy) of a flux tube in terms of the writhe of the tube centerline and the twist of a ribbon determined by the centerline and one of the other field lines in the tube. We show that the writhe is conserved in a reconnection event. Hence, for a pair of interacting tubes of equal flux, if the twist of the reconnected tube is the sum of twists of the individual tubes, then helicity is conserved in a reconnection event. So, any deviation from helicity conservation is entirely due to twist inserted or deleted at the reconnection site. This result has important implications for helicity and energy considerations in various physical contexts.

This work is joint with Christian Laing and Renzo Ricca. (Received February 04, 2014)