1014-53-1467 **Jason Parsley*** (parsley@math.uga.edu), Department of Mathematics, University of Georgia, Athens, GA 30606. *Helicity of vector fields on $S^3$.*

The helicity of a vector field measures the extent to which its flowlines wrap and coil around one another. Helicity is analogous to the writhing number of a curve, and is closely related to the linking number of two curves. On the three-sphere, we define helicity using an integral formula and show this is in accordance with the definition in Euclidean space. For a vector field V defined on a subdomain of the three-sphere, upper bounds on the helicity of V are established. We detail applications of helicity to geometric knot theory, plasma physics, and energy minimization problems for vector fields. (Received September 28, 2005)