

Abstract Submitted
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Topological Helical Vorticity Compression in Ideal Fluids

THOMAS MACHON, University of Bristol — We show how an additional topological conserved quantity arises in ideal fluids whenever the helicity vanishes in such a way that the vorticity field is tangent to a family of surfaces. We give examples of vorticity fields for which this quantity does not vanish, and interpret it as measuring helical compression of vortex lines. We show that if this invariant does not vanish then the flow is not steady, giving a topological obstruction for a vorticity field to come from a steady flow. Finally we discuss relations to the Hamiltonian formulation of the Euler equations.

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