

Abstract Submitted
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Lord Kelvin's Isotropic Helicoid GREG VOTH, DARCI COLLINS, RAMI HAMATI, Wesleyan Univ., FABIEN CANDELIER, Aix Marseille Univ., KRISTIAN GUSTAVSSON, BERNHARD MEHLIG, Gothenburg Univ. — Nearly 150 years ago, Lord Kelvin proposed the isotropic helicoid with isotropic yet chiral interactions with a fluid so that translation couples to rotation. A 3D-printed implementation of his design is found experimentally to have no detectable translation-rotation coupling, although the particle point-group symmetry allows this coupling. These results are explained by demonstrating that in Stokes flow, the chiral coupling of such isotropic helicoids made out of non-chiral vanes is due only to hydrodynamic interactions between these vanes and therefore is small. Kelvin's predicted isotropic helicoid exists, but only as a weak breaking of a symmetry of non-interacting vanes in Stokes flow.

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