On the preferential sampling of helicity by isotropic helicoids[1]

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We
present a theoretical and numerical study on the motion of isotropic helicoids in
complex flows. These are particles whose motion is invariant under rotations but
not under mirror reflections of the particle. This is the simplest, yet unexplored,
extension of the much studied case of small spherical particles. We show that heavy
isotropic helicoids, due to the coupling between translational and rotational degrees
of freedom, preferentially sample different helical regions in laminar or chaotic ad-
vecting flows. This opens the way to control and engineer particles able to track
complex flow structures with potential applications to microfluidics and turbulence.

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