

Abstract Submitted  
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**Exposing the quantum geometry of spin-orbit coupled Fermi superfluids**<sup>1</sup> MENDERES ISKIN, KOC University - Istanbul — The coupling between a quantum particle's intrinsic angular momentum and its center-of-mass motion gives rise to the so-called helicity states that are characterized by the projection of the spin onto the direction of momentum. In this paper, by unfolding the superfluid-density tensor into its intra-helicity and inter-helicity components, we reveal that the latter contribution is directly linked with the total quantum metric of the helicity bands. We consider both Rashba and Weyl spin-orbit couplings across the BCS-BEC crossover, and show that the geometrical inter-helicity contribution is responsible for up to a quarter of the total superfluid density. We believe this is one of those elusive effects that may be measured within the highly-tunable realm of cold Fermi gases.

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