

Giant spin oscillations in an ultracold Fermi sea

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Reference:

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<http://arxiv.org/abs/1307.8392> [2]

Collective behavior in many-body systems is the origin of many fascinating phenomena in nature ranging from swarms of birds and modeling of human behavior to fundamental magnetic properties of solids. We report on the first observation of collective spin dynamics in an ultracold Fermi sea with large spin: We observe long-lived and large-amplitude coherent spin oscillations, driven by local spin interactions. At ultralow temperatures, Pauli blocking stabilizes the collective behavior and the Fermi sea behaves as a single entity in spin space. With increasing temperature, we observe a stronger damping associated with particle-hole excitations. As a striking feature, we find a high-density regime where excited spin configurations are collisionally stabilized.

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