

Abstract Submitted
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Scissors mode of dipolar quantum droplets TIM LANGEN, IGOR FERRIER-BARBUT, MATTHIAS WENZEL, FABIAN BOETTCHER, University of Stuttgart and IQST, MATHIEU ISOARD, SANDRO STRINGARI, University of Trento, TILMAN PFAU, University of Stuttgart and IQST — We report on the observation of the scissors mode of a single dipolar quantum droplet. The existence of this mode is due to the breaking of the rotational symmetry by the dipole-dipole interaction, which is fixed along an external homogeneous magnetic field. By modulating the orientation of this magnetic field, we introduce a new spectroscopic technique for studying dipolar quantum droplets. This provides a precise probe for interactions in the system allowing to extract a background scattering length for ^{164}Dy of $69(4) a_0$. Our results establish an analogy between quantum droplets and atomic nuclei, where the existence of the scissors mode is also due only to internal interactions. They further open the possibility to explore physics beyond the available theoretical models for strongly-dipolar quantum gases.

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