“Faraday waves in Fermi superfluids: formation and dissipation”

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The study of collective excitations in superfluid systems has been an important research topic since the beginning of the exploration of quantum fluids. Their study offers the possibility of probing several important properties of these systems, such as the spectrum of excitations, or the equation of state.

Here we present our work on the exploration of Faraday waves in a cigar-shaped Fermi superfluid composed by a two-component spin mixture of ^{6}Li atoms. These waves are a type of collective excitation that arises as a periodic spatial and temporal modulation of the gas density profile.

In our setup, Faraday waves are parametrically excited by modulating the radial frequency of the trap. We characterize the phenomenon as a function of the interaction parameter by means of a Feshbach resonance. We follow the whole dynamics from the formation of the patterns up to its dissipation and characterize the excitation by extracting its momentum distribution. Moving from the BEC limit towards unitarity, we observe that the Faraday patterns are harder to produce, less intense, and are shorter-lived as the interaction strength increases. We associate this with the corresponding diminution of the system's compressibility.

We finish our contribution by presenting the future perspectives in the study of this phenomenon on different geometries.

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