

Abstract Submitted
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NMR spectroscopy around filling factor three TREVOR DAVID RHONE, LARS TIEMANN, KOJI MURAKI, NTT and ERATO-JST — We probe the spin signatures of a two-dimensional electron system, confined to a GaAs quantum well, around filling factor three ($\nu \sim 3$) using resistively detected nuclear magnetic resonance (RDNMR) spectroscopy at milliKelvin temperatures. Whereas the existence of spin textures, known as skyrmions, around filling factor one is well established, an understanding of the spin degrees of freedom for odd-integer states in higher Landau levels remains elusive. It is believed that for skyrmions to exist at $\nu \sim 3$, the Zeeman energy needs to be smaller than in the case of $\nu \sim 1$ [1]. We measured the spin-lattice relaxation time, T_1 , which is sensitive to these spin textures as they trigger a rapid nuclear spin relaxation. Our T_1 measurements around $\nu = 3$ at 5 T find a small spin-lattice relaxation rate, suggesting the absence of skyrmions. In addition, our Knight shift measurements corroborate this interpretation. Furthermore, we report striking anomalies in the RDNMR spectral line shape and discuss their origin in conjunction with our findings.

[1]N. R. Cooper, Phys. Rev. B 55, R1934 (1997).

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