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Finding a place to die: the fate of a Landau quasi-particle in quantum Hall edge channels[1] CLÉMENT CABART, BENJAMIN ROUSSEL, PASCAL DEGIOVANNI, ENS Lyon, DARIO FERRARO, Aix Marseille Univ, ARTHUR MARGUERITE, GWENDAL FÈVE, ENS Paris, 1SHOT COLLABORATION — Following the recent demonstration of single-electron sources [Science **316**, 1169 (2007)], a new focus has appeared in low-dimensional condensed-matter systems towards the manipulation of coherent electronic excitations. One particular study of importance concerns the fate of energy-resolved single-electronic excitations under the effect of Coulomb interactions. This problem, which was the start of the Landau-Fermi liquid theory for systems of dimension two or more, has still to be tested experimentally at the single-particle level. In this talk, we present both recent theoretical predictions [Phys. Rev. Lett. **113**, 166403 (2014)] for this problem and new experimental results [Phys. Rev. B **94**, 115311 (2016)]. Using an electronic Wigner function, we visualize the role of many-body decoherence in the evolution of a single electron, which allows us to compare theoretical results with experimental data obtained through Hong-Ou-Mandel interferometry. This shows a clear agreement between theory and experiments, providing a full quantitative study of the Landau quasi-particle relaxation problem in one-dimensional conductors. In particular, we show that interactions restore indistinguishability for two electrons initially emitted in almost orthogonal wavepackets.

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