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Wigner function of a quantum Hall edge channel excited at GHz frequency[1] ARTHUR MARGUERITE, Laboratoire Pierre Aigrain, ENS Paris, CNRS, CLMENT CABART, Laboratoire de physique, ENS de Lyon, JEAN MARC BERROIR, BERNARD PLAAIS, Laboratoire Pierre Aigrain, ENS Paris, CNRS, YONG JIN, ANTONELLA CAVANNA, Centre de nanoscience et nanotechnologie, Marcoussis, GWENDAL FVE, Laboratoire Pierre Aigrain, ENS Paris, CNRS — In the rapidly evolving field of quantum computing, tremendous efforts have been made to realize phase-coherent electronics in the hope to process quantum information encoded on the electronic degrees of freedom. It is now possible to create and propagate quantum states with finite temporal and energy extensions. Although differential conductance or current fluctuations enable to recover energy distribution averaged in time of these states, it does not permit a complete reconstruction of a quantum state. To access, for instance, its Wigner distribution one needs a tomography protocol. We will present the implementation of such a protocol in a 2 dimensional electron gas in the regime of integer quantum Hall effect where the 4 terminals geometry allows to separate the source from the probe. Although the protocol is fully universal, we tested it on an edge channel excited with a sinusoidal drive. This creates a many excitations state that, for hf ¿ kT, differs from a simple Fermi sea with a time-varying chemical potential. Indeed, we were able to measure negativities in the Wigner function at a frequency drive of 9 GHz. This is a manifestation of photo-assisted transport which is quantized by nature.

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