Heiblum, Moty: *"Robust electron pairing in the integer quantum Hall effect regime"*

Electron pairing is a rare phenomenon appearing only in a few unique physical systems, e.g., superconductors and Kondo-correlated quantum dots. Here, we report on an unexpected, but robust, electron 'pairing' in the integer quantum Hall effect (IQHE) regime. The pairing takes place within an interfering edge channel circulating in an electronic Fabry-Perot interferometer at a wide range of bulk filling factors, $2<\nu_B<5$. The main observations are: (a) High visibility Aharonov-Bohm conductance oscillations with magnetic flux periodicity $\varphi=\phi_0/2=h/2e$ (instead of the ubiquitous h/e), with e the electron charge and h the Planck constant; (b) an interfering quasiparticle charge $e^*\sim 2e$ - revealed by quantum shot noise measurements; and (c) full dephasing of the $h/2e$ periodicity by induced dephasing of the adjacent edge channel (while keeping the interfering edge channel intact) – a clear realization of inter-channel entanglement. While this pairing phenomenon clearly results from inter-channel interaction, the exact mechanism that leads to e-e attraction within a single edge channel is not clear.