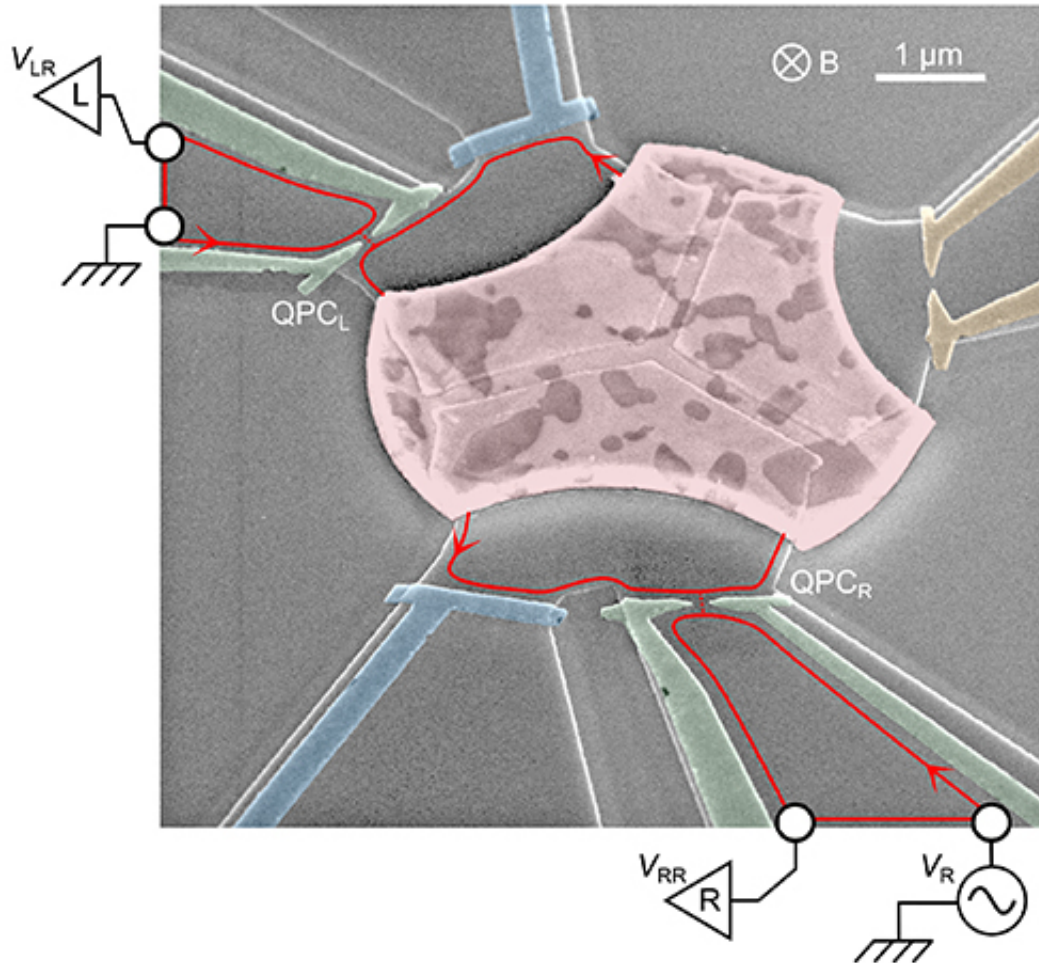


# Finding patterns in 'electron puddles'

August 23 2016, by Jim Shelton



Credit: Yale University

Yale physicist Leonid Glazman has developed a quantitative theory to explain the effect of quantum and thermal fluctuations of charge in tiny

"electron puddles" for a study reported in the journal *Nature*.

Scientists at the Nanoscience Center in Paris, France, created an "electron puddle" within a semiconductor in order to study the particle-wave duality in the nature of electrons.

"Application of an electric potential led to the puddle's charge increasing in steps," said Glazman, the Donner Professor of Physics and Applied Physics. "The stronger the quantum and [thermal fluctuations](#) were, the more smeared these single-electron steps became. This smearing provided the quantitative measure for the fluctuations."

Understanding the quantum laws of electricity is crucial in the development of future nanoelectronic devices, Glazman noted.

**More information:** S. Jezouin et al. Controlling charge quantization with quantum fluctuations, *Nature* (2016). [DOI: 10.1038/nature19072](https://doi.org/10.1038/nature19072)

Provided by Yale University

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