Centre DE Nanosciences & DE Nanotechnologies

C2N General Seminar

Friday September 13th 2019 - 10h 00

Amphitheater of C2N

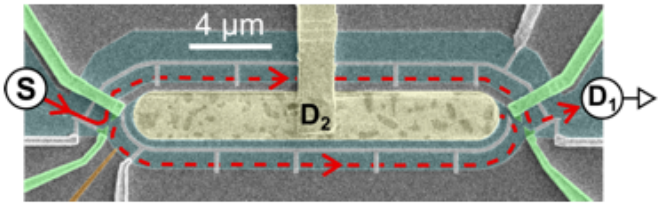
Interplay between Coulomb interaction and quantum coherence in electronic circuits

Hadrien Duprez

(Department of Nanoelectropnics – C2N/Université de Paris)

Mesoscopic physics studies relatively large objects with properties that can only be described by quantum phenomena such as the particle-wave duality. Small electrical circuits cooled down to low temperature where billions of electrons behave as quantum particles, provide a prominent illustration. However, the electrons' quantum character is generally limited to the micrometric scale because of Coulomb interaction with other nearby charges.

In this seminar, I will first show that it is possible to strongly reduce Coulomb interaction's detrimental effect on quantum coherence by circuit engineering. Second, I will explain how to exploit Coulomb interaction to transfer the quantum state of electrons to indistinguishable electrons a few microns away.



Electronic equivalent of a Mach-Zehnder interferometer

Hadrien Duprez Hadrien graduated from the *École Polytechnique de Montréal* in 2016, then obtained a masters degree on Quantum Devices at *Université Paris Diderot* in 2017. During his undergraduate studies, he was lucky to do a one year internship on 2D photonic crystal cavities for low-power laser application at *NTT* in Japan. He now is a 2nd year PhD student in the *Quantum Physics in Circuits* team at C2N.

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