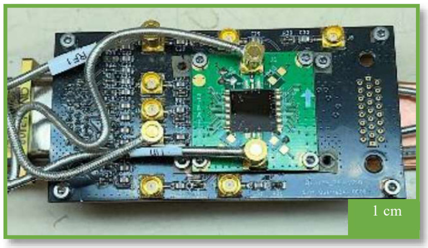
Master/PhD thesis Project

Germanium heterostructure for quantum computing



Wired sample before cryogenic cooling

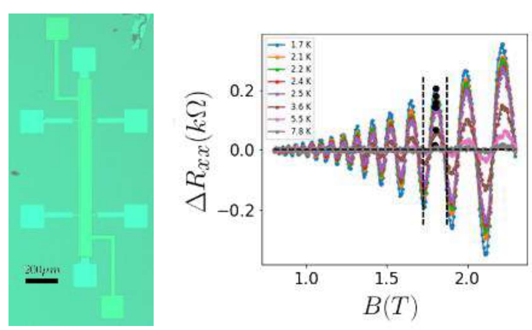
Quantum computing (QC) is currently pushing further the frontier of information technology. Among other fields, solid-state spin qubits and superconducting qubits are promising research areas for QC. Recently our laboratory has developed a new platform for quantum devices based on heterostructures embedding a high mobility germanium hole quantum well. With these heterostructures, we have recently been able to demonstrate our ability to fabricate functional quantum dot devices and Josephson junctions. To further develop this platform, we are currently optimizing the heterostructure to decrease the interface defect density, hence increasing the mobility of the hole gas. In that prospect, we are looking for a talented and motivated Master student to design, fabricate and measure structures to probe the quality of the germanium quantum well.

During the master project, you will collaborate on a daily basis with a lively team of three permanent researchers with two PostDocs and two PhD students and take part of an exciting adventure to make germanium the ideal platform for solid-state quantum computing. You will participate to the development of the samples that includes design, theory and nano-fabrication done in our cleanroom facility. You will also learn to cool down samples to reach cryogenic temperatures. Finally, you will perform high magnetic field, high-resolution low-noise measurements in these cryogenic environments using state-of-the-art setups down to 10mK. Your experimental results will be discussed and understood via theory models as well. This master project is expected to continue as a PhD thesis.

[1] The germanium quantum information route, Scappucci, G. et al. Nat Rev Mater 6, 926–943 (2021)

APPLY NOW!

To apply for this position, send your application (including CV) by e-mail to: vivien.schmitt@cea.fr & silvano.defranceschi@cea.fr



Shubnikov–de Haas oscillations in high-mobility germanium quanum well

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