

## **New Quantum Phenomena in Semiconductor Nanostructures**

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Project Summary:

Recently we have discovered fractional quantization of conductance of quasi-1D systems in the absence of a magnetic field. This unexpected discovery opens a new regime of understanding and exploiting the interaction between electrons. The explanation of this new quantum effect is the establishment of a coherent entangled state between electrons of different momenta. Investigation of the state will take place to determine the degree of immunity against decoherence which breaks up many quantum states preventing their exploitation in the emerging quantum technology. Preliminary theories suggest that the system is robust enough to be favourable as a new scheme of quantum logic data processing and investigation of this will form part of the project.