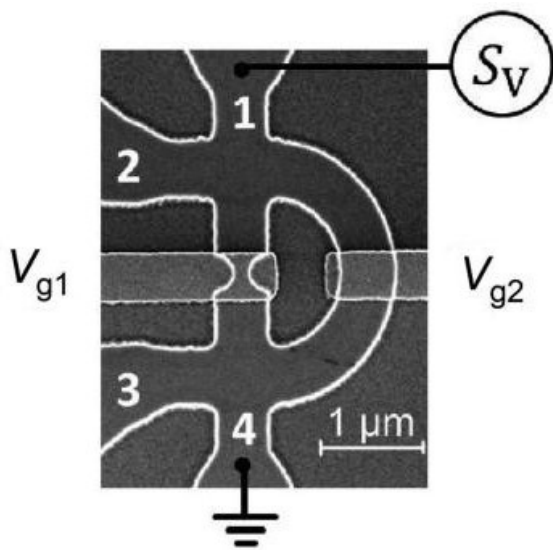


Excess noise in $\text{Al}_x\text{Ga}_{1-x}\text{As}/\text{GAs}$ based quantum rings

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Appl. Phys. Lett. **117**, 063102 (2020).

Short Abstract

Here, we present thermal noise measurements for one-dimensional constrictions and asymmetric quantum rings. For non-branched electron waveguides, the measured and calculated thermal noise fit each other as expected. However, in a branched network of electron waveguides, the measured noise exceeds the calculated one by up to 60%, perhaps due to the correlation of noise sources in the network mediated by the coherence of electrons in the quantum ring. Noise measurements allow the estimation of a correlation coefficient from the excess part of the noise, the knowledge of which could allow the probing of the phase coherence by noise measurements.



Above. Schematic setup of the noise measurement across an asymmetric quantum ring. The electron microscopy shows the quantum ring device with contacts labelled 1 to 4. Both arms are covered by finger gates and the straight arm hosts a quantum point contact.