A Ballistic Graphene Based Cooper Pair Splitter

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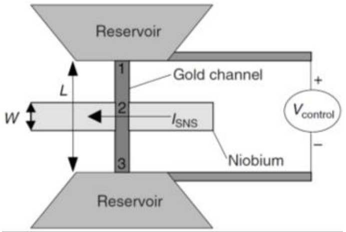
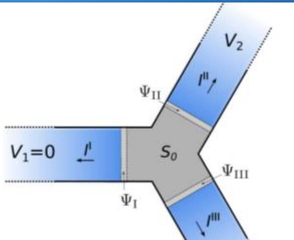
1. Motivation

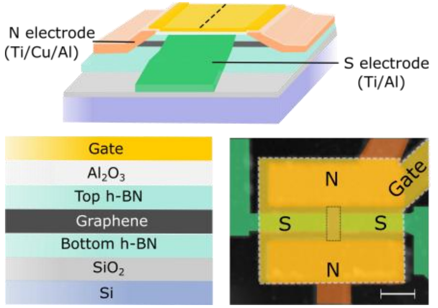


Controlled Josephson weak link [1].



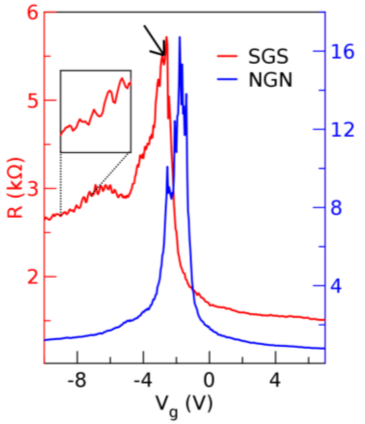
Nonlocal Andreev processes [2].

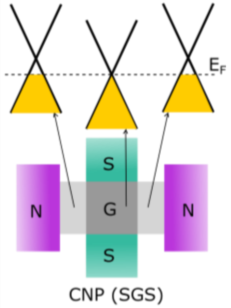
2. Device geometry



- Encapsulated graphene
- Self-aligned 1D edge contacts

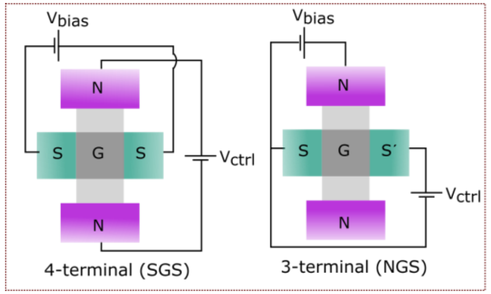
3. Normal state characterisation

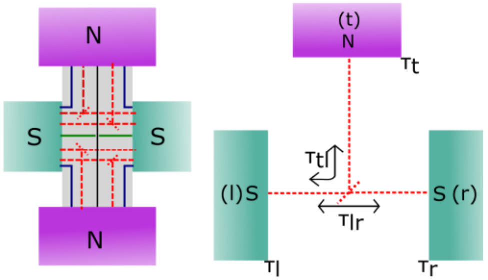




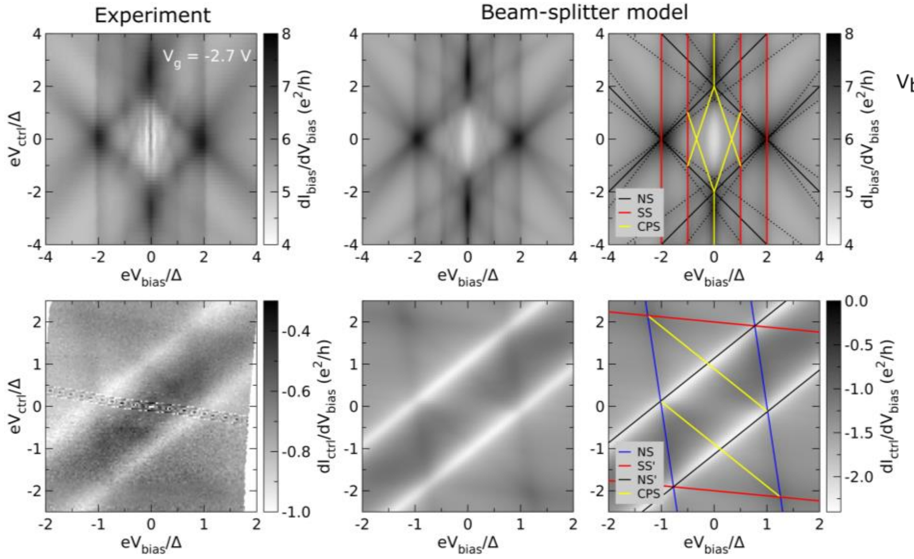
Formation of potential barriers.

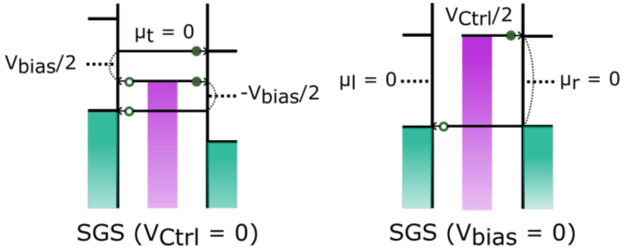
4. Cooper pair splitting: Experiment and modelling

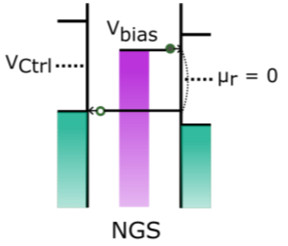




- Local transport processes (solid lines).
- Nonlocal transport processes (dashed lines) through the beam splitter.







- Bias thresholds for the Copper pair splitting (CPS) process.
- Modelled with the generalised BTK [3-5] model and modified OTBK model [6].

5. Summary and Outlook

- Observation of the CPS features in a ballistic graphene device.
- Explanation of the observed features with a 3-terminal beam splitter model.
- Possibility of employing bilayer graphene and additional gates for designing further controlled entanglement measurements.

6. References

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