

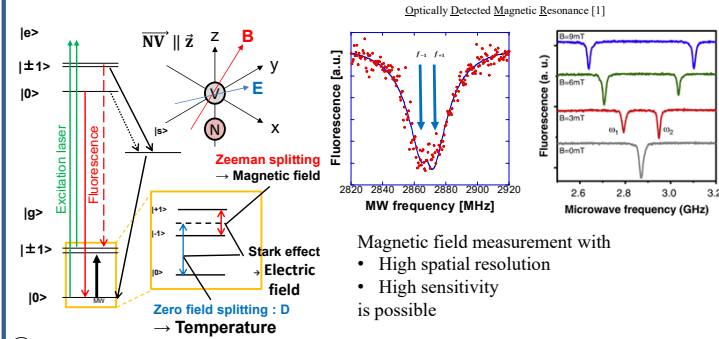
Visualization of current-induced magnetic field distribution in graphene FETs using NV centers in diamond

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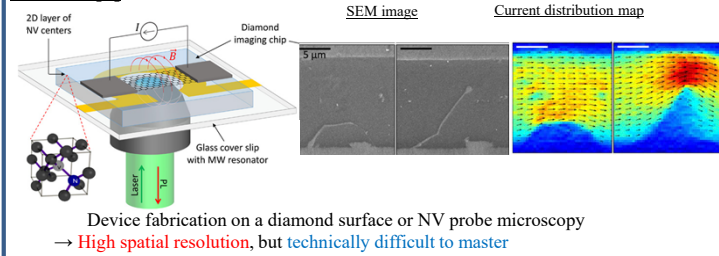
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1. Introduction

① Quantum sensing by Nitrogen Vacancy (NV) centers in diamond



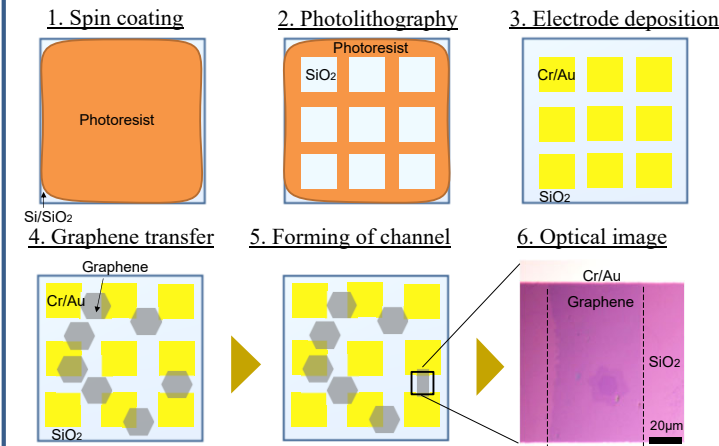
② Imaging of current distribution in graphene channel by NV centers in diamond [2]



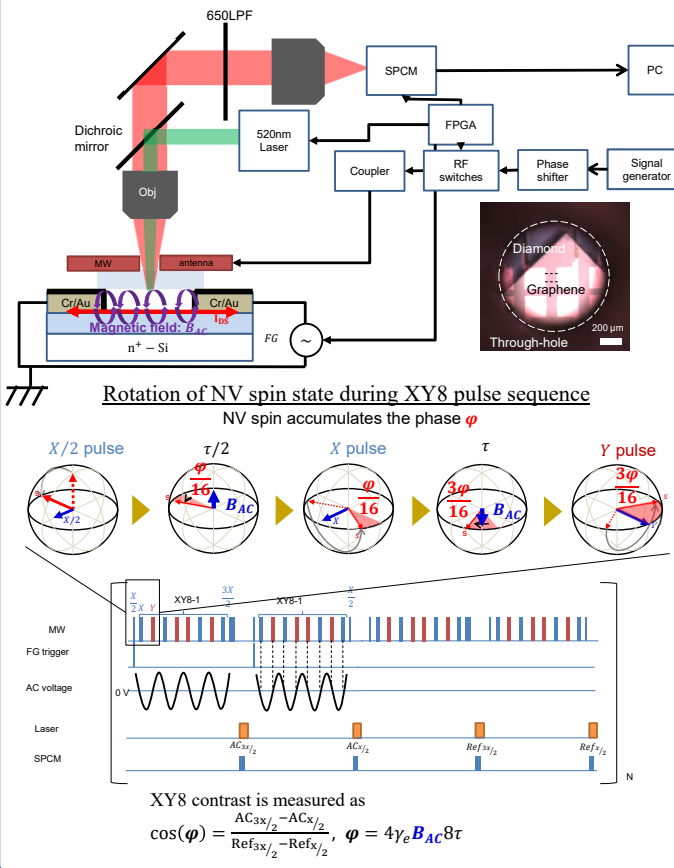
In this study,

Placing bulk diamond with ensemble NV centers on a graphene channel, we map the current distribution by measuring stray AC magnetic field.

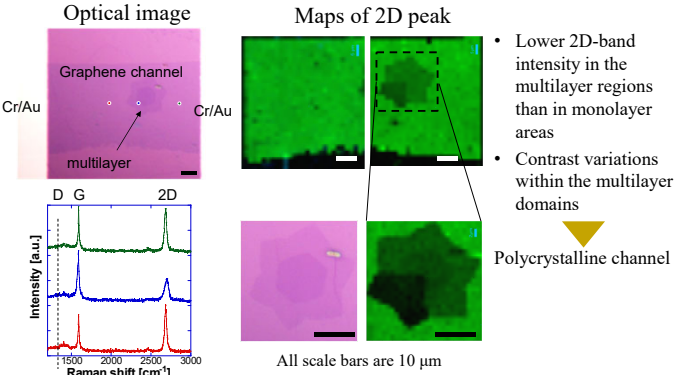
2. Fabrication



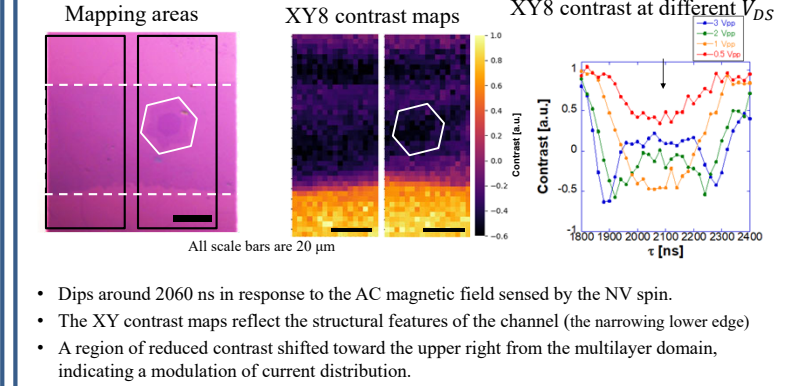
3. Measurement & analysis



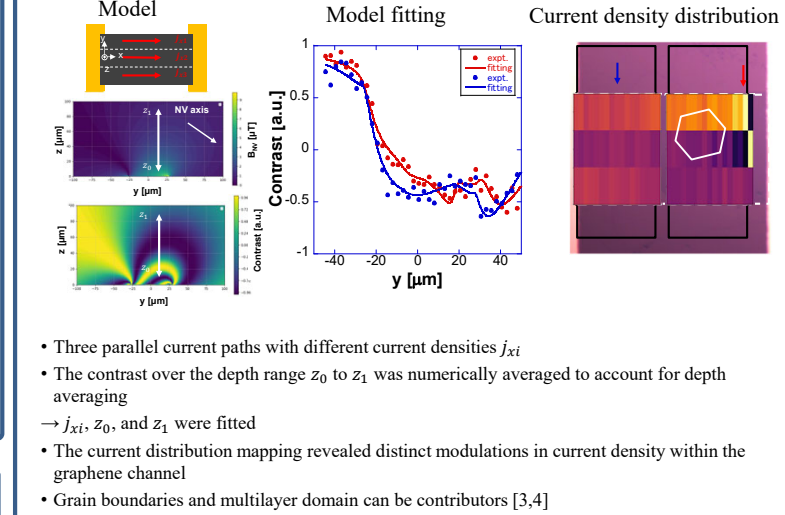
4. Raman spectra and 2D maps of the graphene channel



5. XY8 contrast map



6. Model fitting and current density distribution



7. Summary

Current distribution mapping using ensemble NV centers in bulk diamond can reveal subtle structural inhomogeneities in graphene channels that are not readily observable via conventional optical and/or Raman techniques.

8. Reference

- [1] G Balasubramanian *et al.*, *Curr Opin Chem Biol* **20**, 69-77 (2014).
- [2] J.P. Tetienne *et al.*, *Sci. Adv.* **3**, e1602429 (2017).
- [3] V. L. Nguyen, Y. H. Lee, *Small*, **11**(29), 3512-3528 (2015).
- [4] J.H. Kim *et al.*, *NPG Asia Mater* **16**, 36 (2024).