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Tobias Hangleiter*

May 1, 2025

* A \LaTeX lover/hater

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<https://github.com/fmarotta/kaobook>

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The harmony of the world is made manifest in Form and Number, and the heart and soul and all the poetry of Natural Philosophy are embodied in the concept of mathematical beauty.

– D'Arcy Wentworth Thompson

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Part I

**A FLEXIBLE PYTHON TOOL FOR
FOURIER-TRANSFORM NOISE
SPECTROSCOPY**

Part II

CHARACTERIZATION AND IMPROVEMENTS OF A MILLIKELVIN CONFOCAL MICROSCOPE

Introduction

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Characterization of electrical performance

6



6.1 Electron temperature

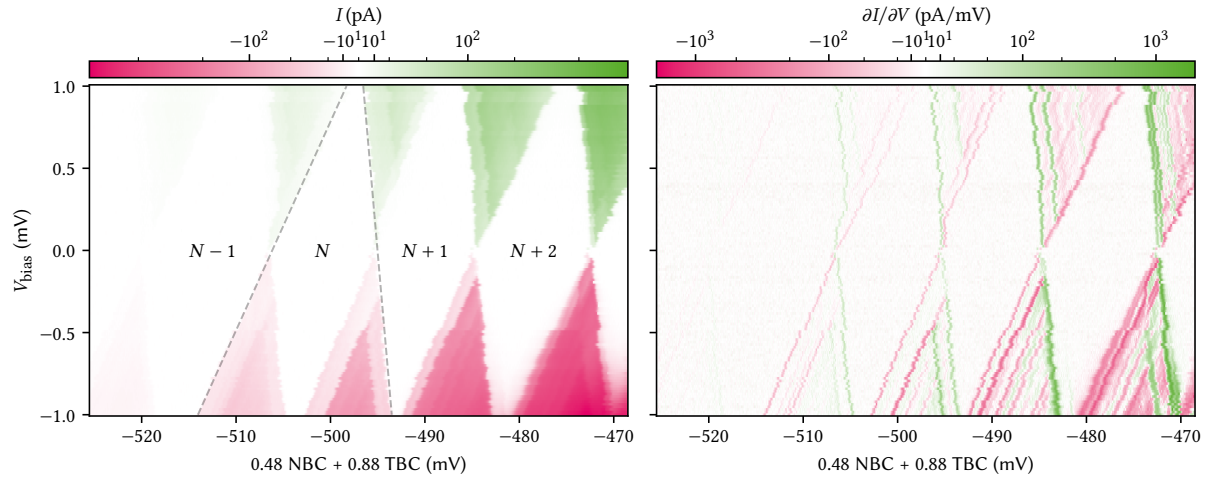


Figure 6.1

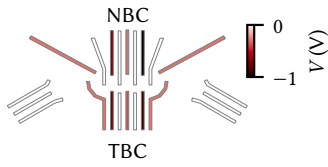


Figure 6.2

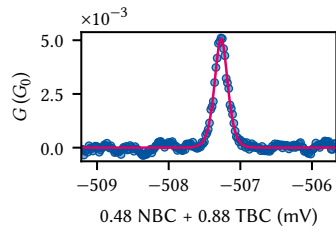


Figure 6.3

Characterization and improvements of the optical path

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Vibration performance

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8.1 Accelerometric vibration spectroscopy

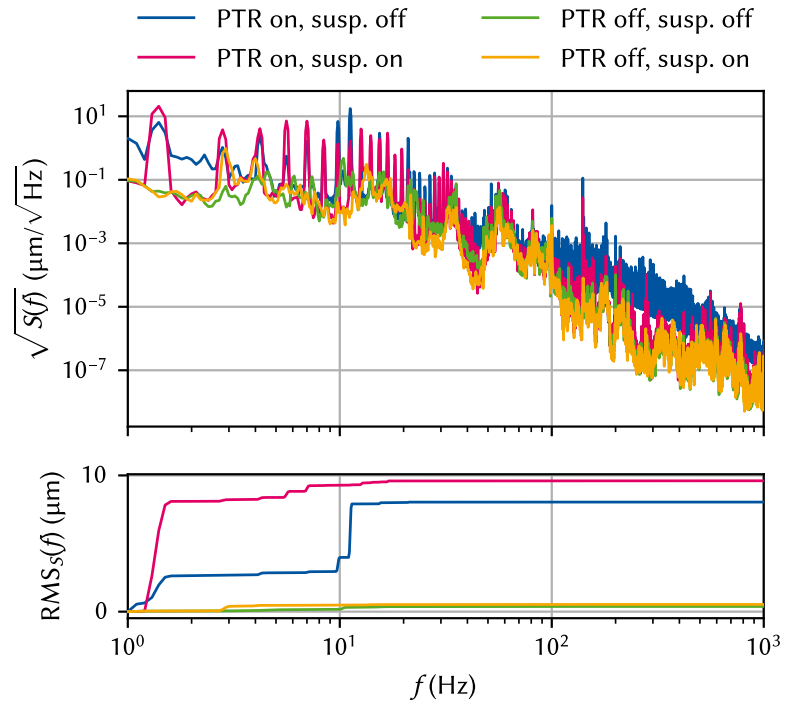


Figure 8.1

8.2 Optical vibration spectroscopy

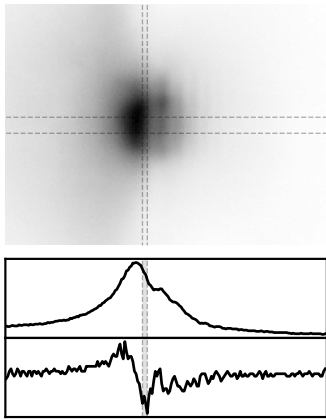


Figure 8.2

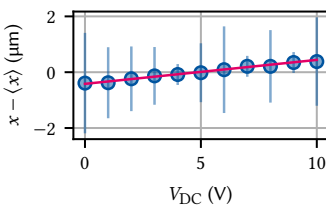
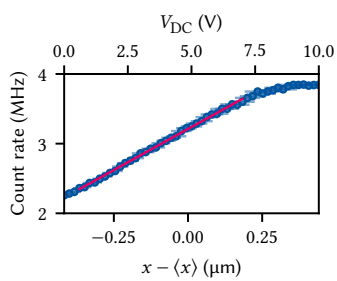


Figure 8.3



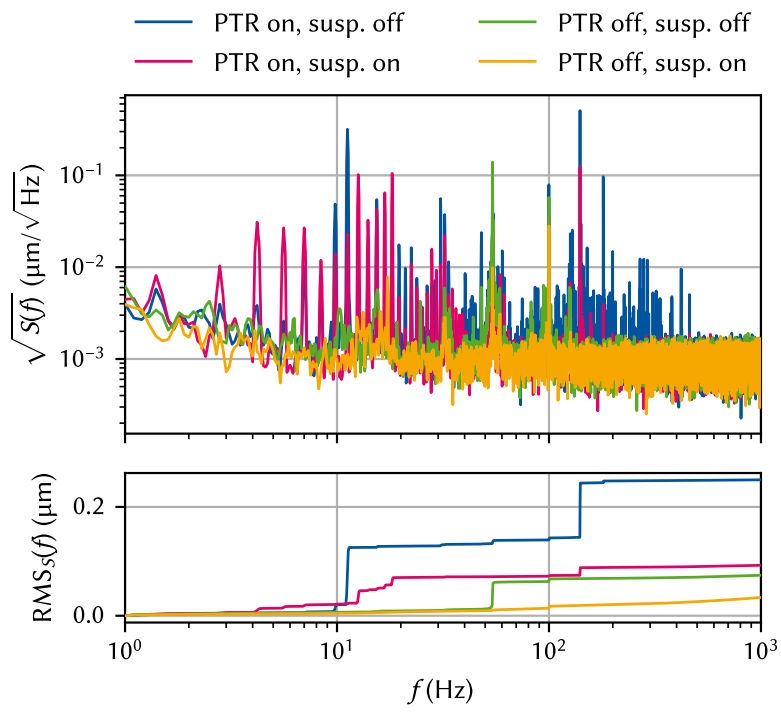


Figure 8.5

Conclusion & outlook

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Part III

**OPTICAL MEASUREMENTS OF
ELECTROSTATIC EXCITON TRAPS IN
SEMICONDUCTOR MEMBRANES**

Part IV

A FILTER-FUNCTION FORMALISM FOR UNITAL QUANTUM OPERATIONS

APPENDIX

Special Terms

F

FF filter function. vii

M

MC Monte Carlo. vii

P

PSD power spectral density. v

Q

QFT quantum Fourier transform. viii

S

SRB standard randomized benchmarking. viii