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April 30, 2025

* A LaTeX lover/hater

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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

Contents

Part I

A Flexible Python Tool For Fourier-Transform Noise Spectroscopy

Part II

Characterization and Improvements of a Millikelvin Confocal Microscope

5 Introduction

NOISE

Characterization of electrical performance

6

NOISE

6.1 Electron temperature

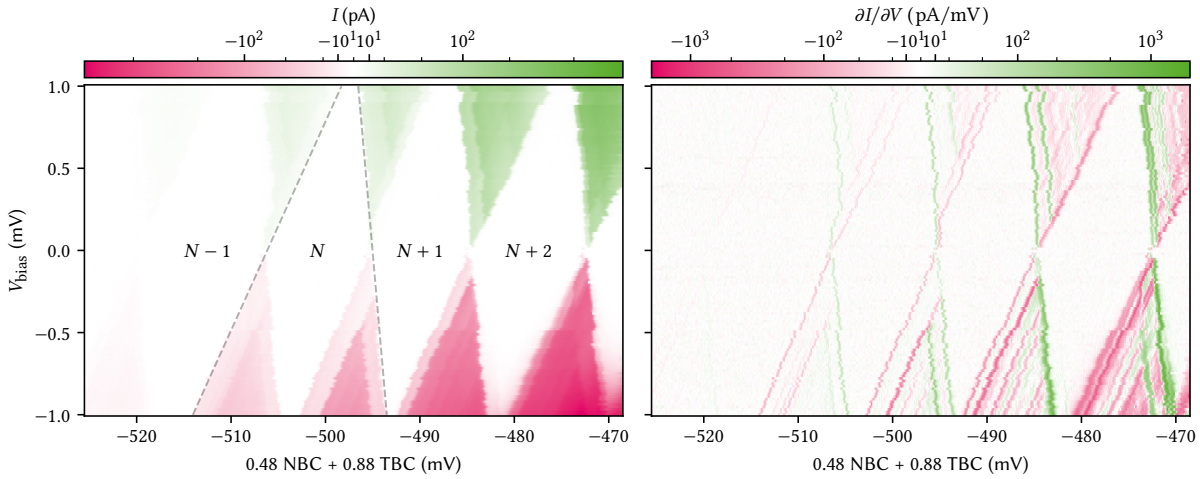


Figure 6.1

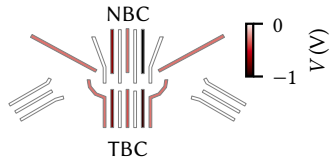


Figure 6.2

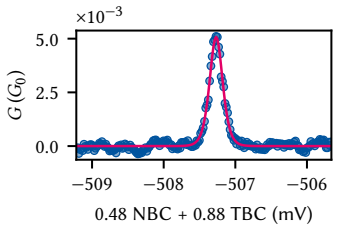


Figure 6.3

Characterization and improvements of the optical path

7

NOISE

Vibration performance 8

NOISE

8.1 Accelerometric vibration spectroscopy

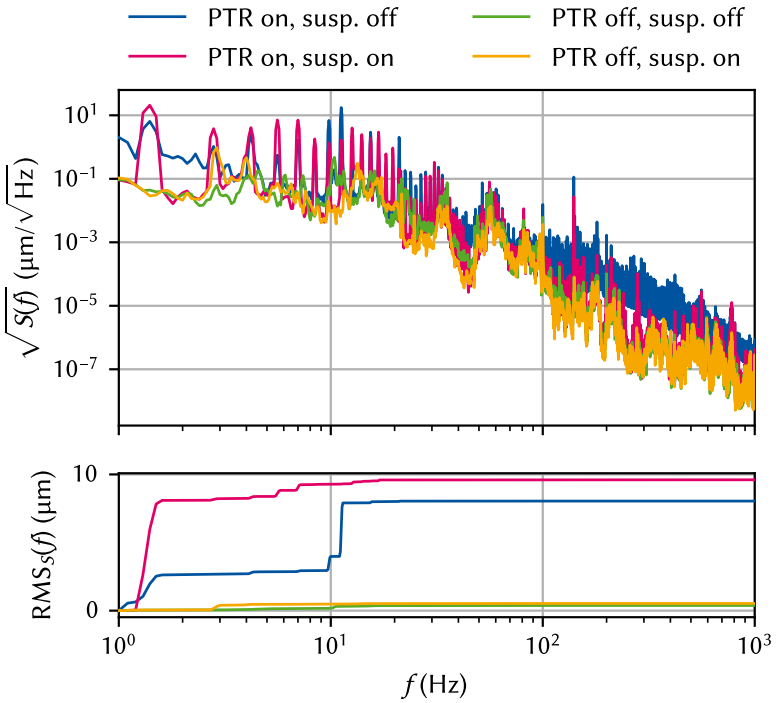


Figure 8.1

8.2 Optical vibration spectroscopy

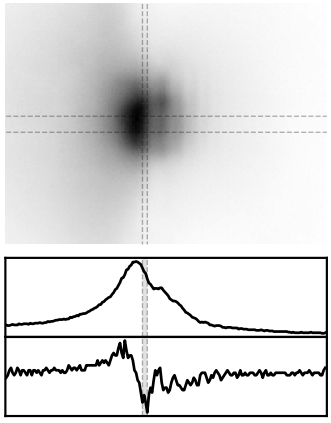


Figure 8.2

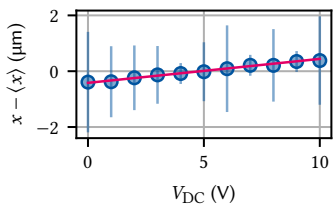
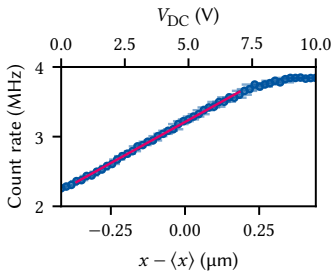


Figure 8.3



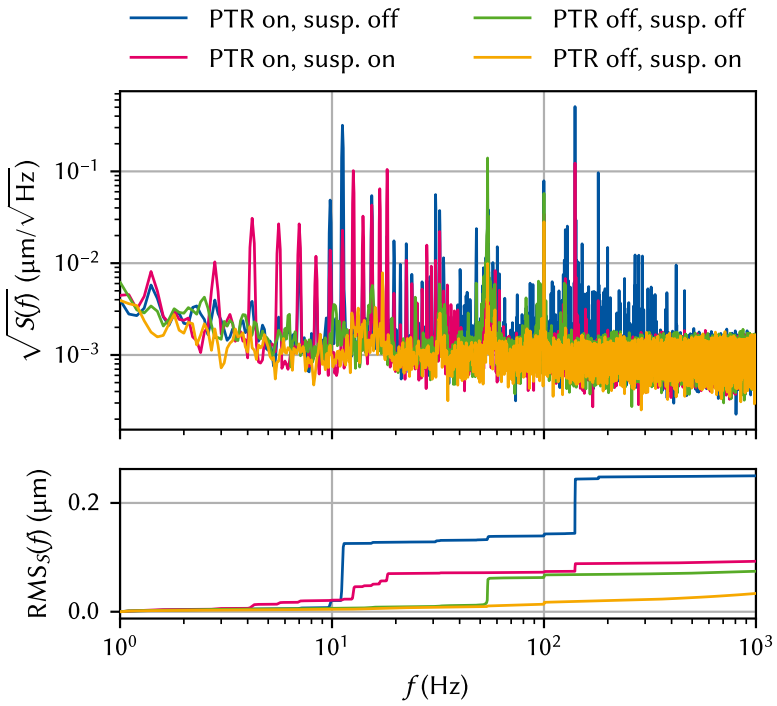

PTR on, susp. off
PTR on, susp. on
PTR off, susp. off
PTR off, susp. on
$\sqrt{S(f)}$ (µm/$\sqrt{\text{Hz}}$)
10^{-1}
10^{-2}
10^{-3}
RMS$_s(f)$ (µm)
0.2
0.0
10^0
10^1
10^2
10^3
f (Hz)

Figure 8.5

Conclusion & outlook 9

NOISE

Part III

Optical Measurements of Electrostatic Exciton Traps in Semiconductor Membranes

Part IV

A Filter-Function Formalism For Unital Quantum Operations

Appendix

Special Terms

P
PSD power spectral density. v