

Superparamagnetic Nanoparticles in Picoliter Droplets for Measurements with Spin Valves



Scientific thesis for the attainment of the academic degree
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of the Department of Electrical and Computer Engineering
at the Technical University of Munich.

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1. Introduction and Motivation

2. Theoretical Prerequisites

2.1. Microfluidics

2.1.1. Flow Fields

2.2. Chemistry

2.2.1. Carbodiimide Crosslinker Chemistry

EDC-NHS-Activation sulfo-NHS vs. NHS

2.3. MRCyte

Short intro over MRCyte Foto of setup with arrows to necessary parts Microscope

Stages PEEK holder Helmholtz coils Kepco MFLI DAQ

2.3.1. Focusing Structures

test,test

2.3.2. GMR

Different produced GMR stacks Wheatstone Bridge setup Magnet alignment

Hysteresis Alignment

test,test

2.3.3. Electrical Circuit

Ground PCB Stacked PCBs with spacer

2.3.4. Electronic Readout

test,test

Single GMR

test,test

Dual GMR

one MFLI supplies both at same frequency. Aux Trigger tested, but no advantage.

3. Materials and Methods

test,test

4. Results

test,test

5. Discussion

test,test

6. Outlook

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Statement

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

Munich, December 4th, 2020, Signature