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Electric field modulation of spin and charge transport in two dimensional materials and complex oxide hybrids

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CONTENTS

ACRONYMS

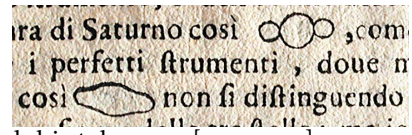
E_F	Fermi level
2D	two-dimensional
3T	three terminal
AFM	atomic force microscope
BHF	buffered hydrofluoric acid
BR	Bychkov-Rashba
DOS	density of states
DP	D'yakonov-Perel'
EBL	electron beam lithography
EY	Elliott-Yaffet
FM	ferromagnetic
GMR	giant magnetoresistance
h-BN	hexagonal boron nitride
IPA	isopropyl alcohol
MR	magnetoresistance
NM	non-magnetic
PC	polycarbonate
PDMS	polydimethylsiloxane
RSS	resonant surface states
SOC	spin-orbit coupling
STO	$SrTiO_3$
TAMR	tunnelling anisotropic magnetoresistance
TMD	transition metal dichalcogenide

PREFACE

You are about to read a thesis which probably looks a bit different than what you are used to. The reason for this is that when I read something it bothered me that text and figures seem to live in different worlds in most books, papers or articles. By this I mean that often when a text refers to a figure, the figure is not located close to the text itself. The physical barrier between the two was a hindrance when trying to grasp an idea or concept, especially since I'm a very visual person and a picture is often worth a thousand words.

Luckily I came across *The Visual Display of Quantative Information*, from Edward Turfte [1]. He felt the same and has thought quite a bit on how to change this for years. Reading his books, I came to understand that in the time of Gallileo and Leonardo da Vinci, it was very common to integrate images into your text, or even use small images which were integrated into a sentence.

An example of this can be seen on the right, where Galileo Galilei integrated images of Saturn into his texts [2]. The top image depicts how he imagined Saturn would look like with perfect vision and the bottom one is how he perceived it through his telescope [3, p. 102].



Also more recently, Martinus Veltman in *Diagrammatica* took a similar approach and abolished figure and equations numbers all together, as he wrote[4, p. xii]:

> This has forced me to keep all derivation and arguments closed in themselves, and the reader needs not to have its fingers at eleven places to follow an argument.

I decided to try a similar concept for my thesis and keep images and text together. For small figures I chose to wrap the accompanying text around it and for larger figures the accompanying text is in the paragraph right above the figure. Furthermore this concept makes the need for captions unnecessary. Additionally I have sometimes placed drawings or graphs with a height equal to the line height into the text itself. This was relatively easily to realise by using LaTeX. For the figures in general I have tried not to use abbreviations, texts at a 90 degree angle and some other ideas which are mostly taken from Tufte's work [1].

I hope this methodology helps the reader more easily understand the concepts of this thesis.

Roald
Groningen, 2016

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4. M. Veltman, Diagrammatica: The Path to Feynman Diagrams (Cambridge University Press, 1994).