

Fakultät für Physik Institut für Theorie der Kondensierten Materie

Quantentransport in Spindichtesystemen mit dem Memory-Matrix-Formalismus

Masterthesis von

Martin Lietz

 $27.\,\mathrm{Mai}\,2017\,\,\mathrm{bis}\,\,27.\,\mathrm{Mai}\,2018$

Referent: Prof. Dr. Jörg Schmalian Korreferent: Prof. Dr. Alexander Shnirman

Ich erkläre hiermit, dass die Arbeit selbstständig angefertigt, alle benutzten Quellen und Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht wurde, das aus Arbeiten anderer unverändert oder mit Abänderungen entnommen ist.
Karlsruhe, den 20. April 2018
(Martin Lietz)
i

Acknowledgments

I would like to express my thanks to my advisor Jörg Schmalian who encouraged and supported me and gave the right hints at the right time during the last year. His essential input lead to the results presented in this work.

Furthermore, I would like to thank Una Karahasanovic for all the discussions and information which became decisive for one topic of this work.

Then, I have to thank especially Jian Kang who crucially contributed to the discussion of bond currents and Rafael Fernandes for the fruitful discussions on the general topic. Special thanks to all the colleagues of the condensed matter group at the KIT. Especially to Bhilahari Jeevanesan for all the discussions and help with several problems and to Pablo Schad for finalizing this work.

Last but not least, I have to thank my family, my mother and sister and especially Anja for all the support and encouraging words.

Contents

1	Motivation	1
2	Spin-Fermion-Model	3
3	Memory-Matrix-Formalsim	5
4	Calculation	7
5	Conclusion	9
Α	Appendix	11

1 Motivation

2 Spin-Fermion-Model

3 Memory-Matrix-Formalsim

4 Calculation

In the last chapter the memory-matrix-formalism was introduced, which give us an exact formula for correlation functions. Now this formalism is used to determine the static conductivity of the spin-fermion-model, introduced in chapter , pertubate umklapp-scattering.

make link to chapter spinfermion-model

Conclusion

A Appendix

Todo list

make	link to	o cha	pter s	spin-	ferm	nion-	-model	l .					 					 								-
manc	111117 (o cha	PICT 6	bm_	10111	11011	mouci	٠.	•	•	•	•		•	•	•	•	 	•	•	•	•	•	•	•	