

Chapter 1

Acknowledgements

“I do not want to end up like one of those scientists, obsessed with his/her research that is performed in a dark laboratory in some basement.”

This is what I said eleven years ago after visiting the open day of Delft University of Technology. I had decided to enroll in the BSc program for Applied Physics because I loved physics in high school, but clearly there was a slight prejudice against scientific research. Ironically, it was exactly in such a dark lab in the basement that I changed my mind. I specifically remember one of the first days of my Msc research project when my advisor, Gijs, told me “Common, lets rotate a single spin by hand”. We were watching the light emitted by a single electron trapped in a diamond sample and as we rotated a knob to generate different magnetic fields we could see the signal drop as we hit the sweet spot where the magnetic field was on resonance with the spin of the electron. In essence we were manually operating one of the worlds smallest and most precise MRI machines. Of course this is just one example and I consider myself lucky to have met so many inspiring people during my time in Delft who have motivated and supported me throughout my PhD.

Ronald, you have been an amazing supervisor and it has been a privilege to work in your group. Thank you for giving me the freedom to develop and pursue my own research interests while also providing the guidance on how to conduct science. You taught me a lot of valuable things perhaps sometimes unconsciously, both scientific and non-scientific. Thanks to you I will always aim to efficiently use my measurement time and appreciate the importance of oscillations and amplifiers that go to eleven. I am amazed by the apparent ease with which you lead your group. You trust your students to do their experiments, yet are always up-to-date and ready to give advice when needed. At the same time you and the PI's at the quantum transport group have created excellent conditions to perform high-impact experiments, while as you called it ‘protecting your students from unwanted external noise’.

I want to thank my colleagues from Team Diamond for all the fun we had both in the lab and outside. With the increasing experimental complexity all our projects rely on team work and I really enjoyed the collaborative atmosphere in our group. Cristian, thank you for being my partner in crime for the adaptive measurement experiments. I hope that you can soon start your own group. Hannes, Wolfgang and Bas, it was a pleasure to generate remote entanglement and perform teleportation with you, although I can not say that I will miss the overnight shifts to keep the experiment going. Hannes, our fabrication sessions in the cleanroom were always productive, both for making samples and for good conversation. Also, I would not have taken up Korean lessons without you, thanks for that. Thank you Wolfgang, for being very patient in teaching me how to code in python. Bas, I will never forget our marathon debug session of the Hermite pulses or our little projects like running teleportation on our phones from the train and cooling our drinks with liquid nitrogen. After almost 10 years of mostly overlapping careers perhaps it is time that we do something different ;) I'm sure you will find a great postdoc position in Australia or elsewhere. Tim, thank you for the countless times that a short question evolved into an insightful discussion. I really learned a lot from you and wish you all the best with your new group.

Toeno, thanks for the great time I had with you measuring on the room-temperature setup during my master project. Gijs, whether it was at the QT-coffee table or in the middle of a party, we always had great discussions which usually converged towards the measurement problem. One day I hope we can discuss the actual solution, for now I want to thank you for the good times we had and for coming over from the USA to be my paraninf. Lucio, thank you for introducing me to the low-temperature setup, I had a lot of fun opening quantum boxes with you. Julia, thanks for many science and non-science related conversations. Keep up the good job on conducting and communicating science.

A lot of exciting experiments lie ahead on the Team Diamond roadmap. Suzanne, Stefan, Anaïs, Norbert and Andreas I'm looking forward to reading about cavities, down-conversion, quantum repeaters and fundamental tests of quantum mechanics in the future. Also thanks to the many master students in Team Diamond Arthur, Oleksiy, Just, Ron, Adriaan, Gerwin, Anne Marije and Michiel. Koen it was a lot of fun to supervise you during your master thesis project. You did a great job on managing a complicated setup on your own and finding a carbon spin to control in the purified sample, which was the basis of the results presented in the final chapter of this thesis. I also had the pleasure to supervise Lisanne and Arno during their Bsc project.

QT really special, has become QuTech. Leo K, Leo DC, L Vandersypen Wrestling matches reinier inappropriate jokes vincent qt-uitje-bus entertainer david Wolfgang, Undor Daniel Stefan sleep over

Raymond, Yuki, Marja, Heera, Bram, Jelle, Remco, Mark
Roomies: Daniel, Iman, Toivo, Vishal, Martin