Interactions from lipid membrane deformations

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List of Publication

Work presented in this thesis:

- A. Azadbakht, B. Meadowcroft, T. Varkevisser, A. Šarić, and D. J. Kraft. Wrapping Pathways of Anisotropic Dumbbell Particles by Giant Unilamellar Vesicles. *Nano Letters*, 23(10):4267–4273, 5 2023 [**Chapter 2**]

- A. Azadbakht, B. Meadowcroft, J. Májek, A. Šarić, and D. J. Kraft. Three-Body Interactions of Lipid Membrane-Deforming Colloidal Spheres. *arXiv preprint*, 6 2023 [**Chapter 3**]

- A. Azadbakht, D. J. Kraft, "Repulsion and attractions in the interactions of inversely membrane-deforming particles", *In preparation.* [**Chapter 4**]

- A. Azadbakht, T. Weikl, D. J. Kraft, "Non-additivity in many-body interactions increases disorder of membrane-deforming spheres", *In preparation.* [**Chapter 5**]

- A. Azadbakht, D.J. Kraft, "Shape matters: curvature-mediated interactions between anisotropic particles", *In preparation.* [**Chapter 6**]

Other Publications:

- M. Sasanpour, A. Azadbakht, P. Mollaei, and S. N. S. Reihani. Proper measurement of pure dielectrophoresis force acting on a RBC using optical tweezers. *Biomedical Optics Express*, 10(11):5639, 2019.

Acknowledgements

I would like to express my sincere gratitude to the people who have tirelessly supported me throughout the PhD, for without your help this thesis would not have been accomplished. First and foremost, I would like to express my genuine gratitude to Daniela Kraft, my esteemed supervisor. Her exceptional academic guidance, step-by-step mentoring, and belief in my abilities have been vital to my academic development.

Next, I would like to thank our scientific collaborators who helped me understand the simulations and theory of the membrane as well as in conducting remarkably precise computer-based measurements. I thank Billie Meadowcroft and Anđela Šarić for their participation in chapters 2 and 3. Anđela's positive feedback and attitude were valuable in achieving the compelling results. I look forward to seeing Billie's beautiful forthcoming thesis. Then I would like to thank Thomas Weikl for his exceptional collaboration in chapter 5. I have learned a lot from his attention to detail and the ability to infuse a deeper understanding of physics into our research. Furthermore, my appreciation goes out to Timon Idema and George Dadunashvili for their initial efforts in simulating the experimental system in chapter 3. Although our collaboration didn't end up in a publication, I witnessed their commitment and the considerable time and effort invested in achieving reliable results.

During my PhD, I had the opportunity to work with two amazing master's students. Thijs Varkevisser, who achieved most of the experimental results of chapter 2. Anna Solovtsova started an exciting challenge of establishing a new link between our lipid membranes and colloids by DNA binding.

Then I would like to thank my kind colleagues of the last four years, Rachel Doherty, who calmly taught me chemistry although I think I ended up being an alchemist. Yogesh Shelke for his humble yet energetic and knowledgeable manner. The conversations with him were always very pleasant for me, especially when he taught me how to partially functionalize the patchy particles in the chapter 4. I would like to thank Julio Melio and Solenn Riedel, not only because they are my paranymphs, but also for all the unforgettable memories they have given me. In addition, Silvana Caipa and Mengshi Wei, with whom I enjoyed every moment. My extend appreciation goes to my former colleagues Ruben Verweij, Stefania Ketzetzi, Samia Ouhaji, Christine Linne and Melissa Rinaldin. Special thanks go to Casper van der Wel. Although I never had the opportunity to meet him, I stood on his shoulders and followed his legacy. His fingerprints are all over this thesis.

I appreciated spending long breaks with Marine, Lennard, Samardashi, Colin,

Margot, Amitesh and Liru in the coffee corner. So did Dimitrios, Ireth, Ludwig and Jose, who hung out in the borrels and seminars. Also Alexandre, Martin and Louise for the friendly atmosphere on the tenth floor and for helping in the SLAM seminar. I would also like to appreciate the company of my Iranian friends, particularly Amin Moradi, with whom I enjoyed spending the breaks and who helped me to be quickly absorbed into the Dutch scientific culture.

I extend my heartfelt appreciation to my family and friends who have always showered me with love and support. To my dear sister Nika, with whom I share a strong bond despite the long distance that separates us, and to my smart second sister Saba, who moved closer to us. I would like to express my deepest gratitude to my beloved mother and father, who have been an unwavering pillar of encouragement and support since the day I was born, with no expectations in return. I would also like to thank my mother and father-in-law, with whom we made memories during our vacations in Iran. Their presence and love were invaluable to me.

Last but certainly not least, I want to acknowledge that this thesis, and all my accomplishments would not have been possible without the unwavering support of Sanam. She has instilled in me the belief that miracles can indeed exist in this world. I am deeply grateful for all the days and nights she devoted to listening to my concerns and encouraging me for the challenges of the next day. Words can not express the depth of my gratitude and feelings for her.

Curriculum Vitae

Ali Azadbakht was born on the 17$^{\text{th}}$ of October, 1990, in Sari, Iran. He embarked on his academic journey by pursuing a bachelor's degree in solid-state physics at the University of Mazandaran, Iran, from which he successfully graduated in 2014.

Subsequently, he furthered his academic pursuits with a master's degree in physics at Sharif University of Technology. During his master's studies, he conducted research under the guidance of Dr. S.N.S. Reihani, focusing on a project entitled 'Investigation of Mechanical Properties of Red Blood Cells by Optical Tweezers,' specializing in experimental biophysics and soft matter. Following the completion of his master's degree, Ali gained practical experience as a microscope technician for over two years, primarily working with Laser Scanning Confocal and Atomic Force Microscopes. Throughout his employment, he remained actively involved in research projects and took on the role of supervising master's students.

In July 2019, Ali moved to the Netherlands to begin a PhD in physics under the supervision of Prof. D.J. Kraft. This journey resulted in the completion of this dissertation on 'Interactions from Lipid Membrane Deformations.' During his Ph.D. program, he supervised two master's students and contributed as a teaching assistant in courses such as 'Experimental Physics 2' and 'Modern Astronomy and Physical Research'. As part of his Ph.D. work, Ali designed and installed a fast holographic optical tweezers on a confocal microscope in Kraft's lab. He also organized a seminar on soft, living and active matter (SLAM) for almost a year. Ali participated and presented in many conferences, e.g., Biomembrane Days, Physics at Veldhoven, Dutch Biophysics, and the APS March Meeting.

Upon obtaining his doctorate, he will begin a short postdoctoral position within Professor Kraft's laboratory. During this period, he will study evaporation of droplets and their relevance to respiratory viruses.