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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. Weigl, 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.

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Curriculum Vitae

Ali Azadbakht was born on the 17th 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.