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Synthetic model microswimmers near walls

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Citation

Ketzetzi, S. (2021, June 29). *Synthetic model microswimmers near walls. Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/3185906>

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Author: Ketzetzi, S.

Title: Synthetic model microswimmers near walls

Issue date: 2021-06-29

Acknowledgements

I am happy to take the opportunity here to thank (hopefully) everyone who has, one way or another, contributed to this work. First and foremost, I wish to thank Daniela for being my supervisor and mentor. Daniela, thank you for encouraging me to explore, for supporting my ideas, and for guiding me with interest and enthusiasm. I also thank you because at times you pushed me to prioritize between the different projects which helped me greatly in completing them, you helped me find my passion for writing, and you advised me not only regarding the research topics at hand but also life in academia and life in general. I thank Martin van Hecke for being my promotor and the Doctorate Committee members for evaluating my thesis. I thank Daniëlle Duijn-ter Veer and Ellie van Rijsewijk for help with bureaucratic matters and Ruud Kuyvenhoven for technical support.

I also wish to thank the people that collaborated with me on the projects that ended up shaping this thesis. Joost, thank you for your interest and patience, for illuminating discussions and much useful advice and help, and for all your valuable contributions to this work; it has been a pleasure collaborating with you. Ruben and Melissa, thank you for being such fantastic colleagues and office-mates. Ruben, I especially appreciated your methodical way of working, thank you for such a smooth collaboration, for fruitful discussions, feedback and support, for helping me with programming as well as with my "samenvatting" and cover. Melissa, I highly appreciate your passion for research, your creativity and positive work attitude, thank you for your support and all the advice you have given me. Rachel, thank you for organizing the lab and for always being eager to help, for providing me with particles, and for the valuable insights and different perspective you brought to our projects. I thank my students Pim and Ivar for their contributions to my thesis and for aiding me to develop skills in supervision and teaching. I thank Federica Galli for help with AFM measurements and Sandra Remijn for help with substrate zeta potential measurements.

Moreover, I thank all past and present members of the soft and bio matter groups for the pleasant working environment, for scientific discussions, for group meetings and seminars, for the coffee breaks and outings during the pre-pandemic years. To Samia and to all the students researching active particles in the lab, Margot, Thijs, Nick, Sarah, Jonas, Anna, and Leander, thank you for great insights, discussions, and feedback. To Casper, Vera, Christine, Ali, Yogesh, Anne, Kirsten, Luca, Koen, Piermarco, Dan, Peter, Ludwig, Niladri, Jose, Livio, Solenn, Alexandre, Marine, Julio, and others I omitted unintentionally, thank you for useful discussions, feedback, help and/or company and support. Ireth, I highly

Acknowledgements

appreciated our discussions, thank you for all your help and support, for being such a great house-mate and for agreeing to be my paranymph.

Finally, I wish to thank my parents for supporting my studies, and my brother for the support and encouragement we have always given each other. Dimitri, I cannot even begin to list the many reasons why I want to thank you; let me just say thank you for keeping me sane over the years.

Stefania Ketzetzi
Leiden
May 31, 2021

List of Publications

Work presented in this thesis:

1. **S. Ketzetzi**, J. de Graaf, R. P. Doherty, and D. J. Kraft, [Slip Length Dependent Propulsion Speed of Catalytic Colloidal Swimmers near Walls](#), **Phys. Rev. Lett.** 124, 048002 (2020) — **Chapter 2**
Highlighted in Leiden University News and phys.org
2. **S. Ketzetzi**, J. de Graaf, and D. J. Kraft, [Diffusion-Based Height Analysis Reveals Robust Microswimmer-Wall Separation](#), **Phys. Rev. Lett.** 125, 238001 (2020) — **Chapter 3**
3. **S. Ketzetzi**, M. Rinaldin, P. Dröge, J. de Graaf, and D. J. Kraft, [Activity-induced microswimmer interactions and cooperation in one-dimensional environments](#), **Submitted (2021)** — **Chapter 4**
4. R. W. Verweij*, **S. Ketzetzi***, J. de Graaf, D. J. Kraft, [Height Distribution and Orientation of Colloidal Dumbbells Near a Wall](#), **Phys. Rev. E** 102, 062608 (2020) — **Chapter 5**
5. **S. Ketzetzi**, I. Schröten, R. P. Doherty, and D. J. Kraft, *In preparation (2021)* — **Chapter 6**

Other publications:

6. R. P. Doherty, T. Varkevisser, M. Teunisse, J. Hoecht, **S. Ketzetzi**, S. Ouhajji, and D. J. Kraft, [Catalytically propelled 3D printed colloidal microswimmers](#), **Soft Matter** 16, 10463-10469 (2020).
Highlighted in BBC, CNN, The London Times, Nature, NRC, and more
7. B. Weber*, Y. Nagata*, **S. Ketzetzi**, F. Tang, W. J. Smit, H. J. Bakker, E. H. G. Backus, M. Bonn, D. Bonn, [Molecular Insight into the Slipperiness of Ice](#), **J. Phys. Chem. Lett.** 9, 2838 (2018).
Highlighted in UvA News, ScienceDaily, phys.org and more
8. **S. Ketzetzi**, J. Russo, D. Bonn, [Crystal Nucleation in Sedimenting Colloidal Suspensions](#), **J. Chem. Phys.** 148, 064901 (2018)

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About the author

I obtained my BSc degree in physics with specialization in *Atmospheric physics* from the Aristotle University of Thessaloniki (2014). My thesis, *Sensitivity of Direct Normal Solar Irradiance at Variations of Aerosol Optical Depth and Column Water Vapor*, was supervised by Prof. Dr. Alkiviadis Bais. I obtained my MSc degree in physics with specialization in *Experimental physics* from the University of Amsterdam (2016). My thesis, *Effect of Sedimentation on Crystal Nucleation in Colloidal Systems*, was supervised by Prof. Dr. Daniel Bonn. In 2017, I started as a PhD candidate in *Active soft matter physics* at Leiden University under the supervision of Dr. Daniela Kraft. I studied the self-propulsion of catalytic microswimmers near walls, the results of which are presented in this thesis. Parts of this work were performed in collaboration with Dr. Joost de Graaf (Utrecht University), Dr. Ruben Verweij, Dr. Rachel Doherty and Dr. Melissa Rinaldin (Kraft Lab).

During my PhD studies, I assisted in the BSc courses *Moleculaire Physica* and *Physics Experiments 2* as well as (co)supervised the theses of four BSc and MSc students with projects ranging from the self-propulsion of spherical and non-spherical catalytic model swimmers near curved and planar walls respectively, to colloidal diffusion, sedimentation and wall distance measurements with holographic microscopy. Since 2016, I have given multiple poster presentations and talks at conferences, PhD schools, and seminars. Most notably, I contributed talks at the APS (Boston, USA 2019 and Denver, USA 2020) and at CHAINS (Veldhoven, Netherlands 2020) and I gave the Nanoseminar of the Debye Institute for Nanomaterials (Utrecht, Netherlands 2020, invited). In 2020, I was nominated for the "Discoverer of the Year" Public Award representing the Leiden Institute of Physics; I finished third by public vote.