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Synthetic model microswimmers near walls

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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.