

Curriculum Vitae

Arthur La Rooij

Contact Information:

Name : A.L. La Rooij 0-3, 9 Hanson Park
Date of birth : 18-12-1987 G31 2HJ
Place of birth : Amsterdam, Netherlands Glasgow, UK
Email : arthur.larooij@strath.ac.uk www.arthurlarooij.nl

Research Interests

My interests focus on the nature of many-body quantum systems of ultracold atoms in optical lattices. As a senior postdoc and defacto co-group leader in the group of Stefan Kuhr I lead the day to day activities of a team for 4 PhD Students. Together we operate two state-of-the-art quantum-gas microscopes in which we can study many-body quantum physics with single atom resolution. This year, we have developed dynamic and local control over the lattice potentials and are using this to study how the changes in geometry and the presence of disorder effect the properties of the atomic gas. This experimental work is supported by the ongoing collaboration with the theory team of Prof. Andrew Daley (Strathclyde/Oxford). In a collaboration with Elmar Haller's team at Strathclyde we have studied Floquet dynamics in a 1D geometry using a Caesium Bose-Einstein Condensate that resulted in three papers in the last two years. I often use my background in condensed matter theory and nanofabrication as we interact with physicists working on other quantum technologies. In the coming years I aim to extend our quantum simulation experiments to more complex lattice geometries and to study transport properties using single atoms.

Education:

<i>2018-present</i>	Postdoctoral Research Associate in Experimental Physics University of Strathclyde Quantum gas microscope experiments with ^{40}K and $^{87/85}\text{Rb}$ using programmable light potentials within the UK Quantum Technology Hub for Quantum Computing and Simulation and the EPSRC Programme Grant 'DesOEQ'
<i>2016-2018</i>	Postdoc Experimental Physics École normale supérieure (Laboratoire Kastler Brossel) Fiber Fabry Perot cavity-QED with a single atom microscope Supervisor: Romain Long and Jakob Reichel
<i>2012-2016</i>	PhD Experimental Physics University of Amsterdam Nanoscale magnetic atom traps for quantum simulation (thesis) Supervisor: Robert Spreeuw and Ben van Linden van den Heuvell
<i>2009-2012</i>	Master Theoretical Physics University of Amsterdam Specializations in condensed matter and philosophy of science Masterproject on the Single Electron Transistor (thesis)
<i>2006-2009</i>	Bachelor Physics and Astrophysics, <i>UvA</i> , Specializations: Philosophy Bachelorproject Standard Model Physics (thesis)

Personal profile:

Analytical. Creative. Team player. Responsible. Athletic.

Curriculum Vitae

Arthur La Rooij

Teaching Experience:

- 2012-2014 University of Amsterdam (Atomic Physics with Prof. Jook Walraven)
- 2010-2012 University of Amsterdam (Academic Tutor for 1st year students)
- 2008-2011 Topscore Amsterdam (Badminton teacher at various high schools.)

Extracurricular Activities:

- 2010-2011 Organised the Dutch Physics Society Conference "Fysica 2011"
- 2009-2010 President of the student association NSA

Collaborations:

1. Prof. Dr. A. Daley / Dr. C. Duncan (Strathclyde)
2. Prof. C. de Morais-Smith (Utrecht)

Publications:

1. [Instabilities of interacting matter waves in optical lattices with Floquet driving](#), A. Di Carli, R. Cruickshank, M. Mitchell, A. La Rooij, S. Kuhr, C.E. Creffield, E. Haller, Under review, Arxiv:2303.06092, (2023)
2. [A comparative study of deconvolution techniques for quantum-gas microscope images](#), A. La Rooij, C. Ulm, E. Haller, S. Kuhr, Under review, (2022)
3. [Accurate holographic light potentials using pixel crosstalk modelling](#), P. Schroff, A. La Rooij, E. Haller, S. Kuhr, Scientific Reports **13**, 3252 (2023), Arxiv:2207:08663, DOI: 10.1038/s41598-023-30296-6
4. [Floquet solitons and dynamics of periodically driven matter waves with negative effective mass](#), M. Mitchell, A. Di Carli, G. Sinuco-León, A. La Rooij, S. Kuhr, E. Haller, Physical Review Letters **127**, 243603, (2023), DOI: 10.1103/PhysRevLett.127.243603
5. [An optical elevator for precise delivery of cold atoms using an acousto-optical deflector](#), F. Ferri, A. La Rooij, C. Lebouteiller, PA. Bourdel, M. Baghdad, S. Schwartz, S. Garcia, J. Reichel, R. Long, New J. Phys. **24**, 043013 (2022), DOI: 10.1088/1367-2630/ac5f84
6. [Deposition and patterning of magnetic atom trap lattices in FePt films with periods down to 200nm](#), A. L. La Rooij, S. Couet, M. C. van der Krogt, A. Vantomme, K. Temst, R. J. C. Spreeuw, Journal of Applied Physics **124**, 044902 (2018), DOI: 10.1063/1.5038165
7. [Designs of magnetic atom trap lattices for quantum simulation experiments](#), A. L. La Rooij, H.B. van Linden van den Heuvell, R. J. C. Spreeuw, Physical Review A **99**, 022303 (2019), DOI: 10.1103/PhysRevA.99.022303
8. [Probing the magnetic moment of FePt micromagnets prepared by Focused Ion Beam milling](#), H. C. Overweg, A. M. J. den Haan, H. J. Eerkens, P. F. A. Alkemade, A. L. La Rooij, R. J. C. Spreeuw, L. Bossoni, T. H. Oosterkamp, Applied Physics Letters **107**, 072402 (2015), DOI: 10.1063/1.4928929
9. [Magnetic-film atom chip with 10 \$\mu\text{m}\$ period lattices of microtraps for quantum information science with Rydberg atoms](#), V.Y.F. Leung, D.R.M. Pijn, H. Schlatter, L. Torralbo-Campo, A.L. La Rooij, G.B. Mulder, J. Naber, M.L. Soudijn, A. Tauschinsky, C. Abarbanel, B. Hadad, E. Golan, R. Folman, R.J.C. Spreeuw, Review of Scientific Instruments, **85**, 053102 (2014), DOI: 10.1063/1.4874005
10. [Magnetische roosters van koude atomen als quantumsimulatoren](#)(Dutch). Nederlands Tijdschrift voor Natuurkunde **80**, 162-164 (2014). A. L. La Rooij, R. J. C. Spreeuw