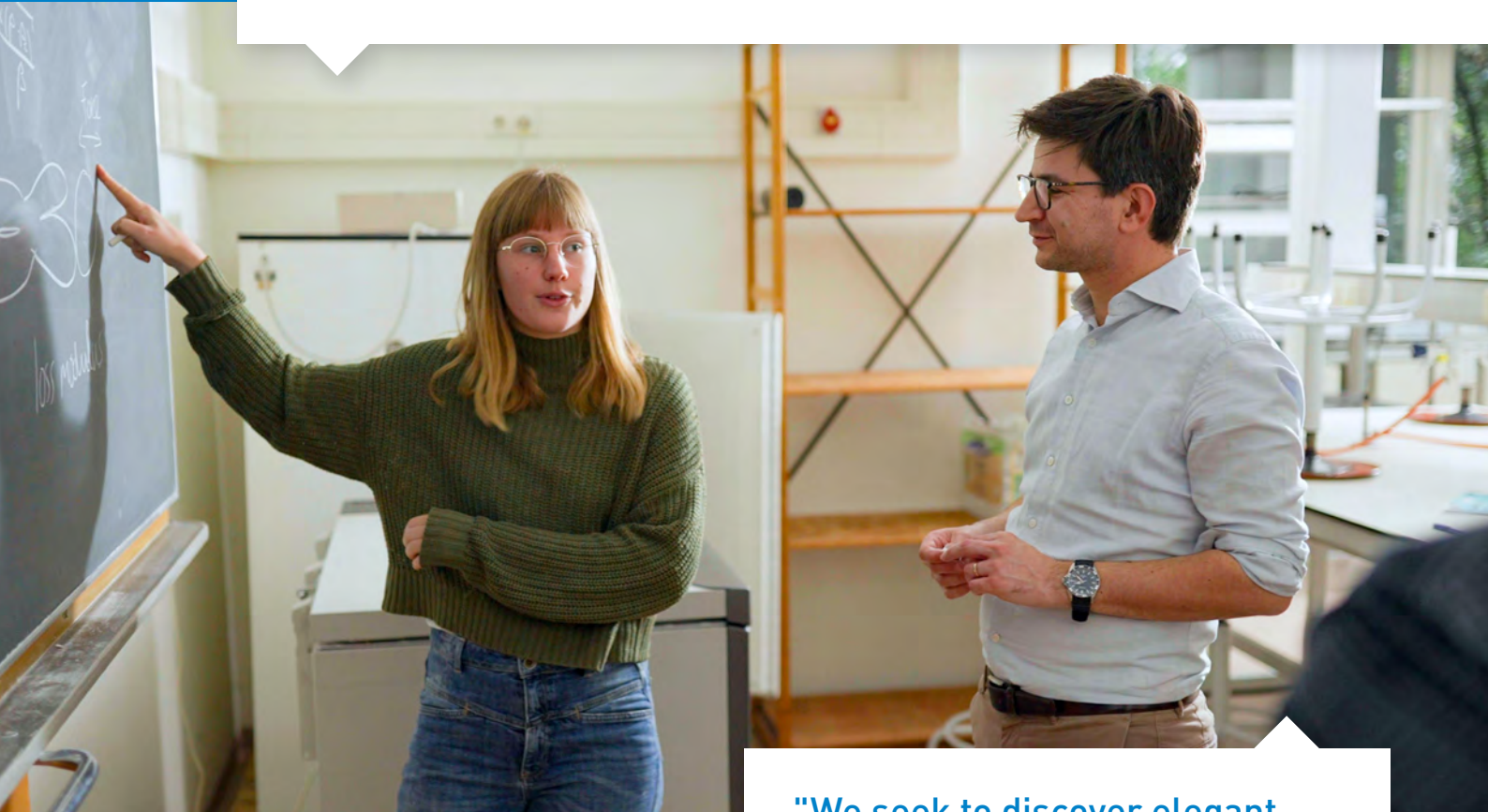


Physics & Astronomy Newsletter

The Faculty of Science
Physics and Astronomy Department
Issue 3 June 2025



Grant & Awards 3

Recent PhD Theses 8

Interview 12

Highlighted Papers 14

News & Announcements 18

"We seek to discover elegant patterns and physical laws that govern living systems"

Chase Broedersz



In this issue:

Grant & Awards	4
Recent PhD Theses	9
Interview	12
Highlighted Papers	14
News & Announcements	17

Colophon

Editors
Physics and Astronomy Department
Secretariat

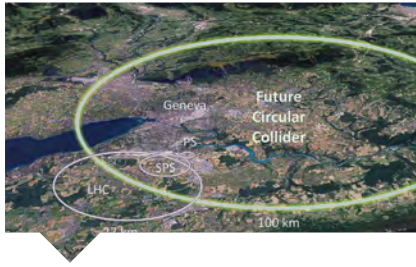
Design
VU Amsterdam Designstudio

Department's video & images
Sander van Iersel and Tim Visser,
Jester&Wylde

Printing Company
Libertas Pascal, Utrecht



Grant & Awards



Europe Funds Future Collider Research with €600K AI-Quantum Grant

A consortium of researchers in particle physics from various European institutes, among which **prof. dr. Juan Rojo** (VU Amsterdam and Nikhef) and under the coordination of dr. Riccardo Torre (INFN Genova), have been awarded a COST Action with title "Machine Learning and Quantum Computing for Future Colliders" by the EU's Horizon Europe programme. The awarded funding of 600k eur for the period 2025-2029 will support networking and coordination activities such as workshops and short-term Scientific Missions.

[Read more →](#)



NWO grant for Dr. Iddo Heller Research on Ice-Recrystallisation

Four application-oriented projects, including that of assistant professor of Physics of Living System **dr. Iddo Heller**, can start with the help of funding from the Open Competition ENW - XS of the Netherlands Organisation for Scientific Research (NWO).



NWO ENW-M2 grant of 800 k€ to prof. dr. Kjeld Eikema and prof. dr. Hendrick Bethlem

NWO has awarded an ENW-M2 grant of 800 k€ to **prof. dr. Kjeld Eikema** and **prof. dr. Hendrick Bethlem** of the Quantum Metrology and Laser Applications group at the VU Amsterdam. The aim is to investigate helium atoms and ions with advanced lasers to test the fundamentals of physics and strongly improve a measurement of the charge radius of the alpha (He-4 nucleus) and helion particle (He-3 nucleus). This can then be compared to other measurements, such as those performed with exotic muonic helium ions created at particle accelerators, to look for new physics beyond the Standard Model and to improve the accuracy of the fundamental constants of nature. [Read more →](#)

Iddo Heller for his research **You're as cold as ice, but not willing to sacrifice your life?** What do space travelers, crop protection, organ- and food-preservation, and climate-change-related ice restructuring have in common? All involve solid-liquid mixtures in which thermodynamically driven (ice-) recrystallisation processes can cause harmful/fatal crystal growth. Nature has evolved ingenious ways to inhibit ice-recrystallisation, which allows insect survival even down to -70°C .

[Read more →](#)



VU scientists win the 2025 Breakthrough Prize in Fundamental Physics

VU scientists **prof. dr. Gerhard Raven**, **assoc. prof. Mara Senghi Soares**, **prof. dr. Wouter Hulsbergen** and their PhD candidates win the 2025 **Breakthrough Prize** in Fundamental Physics. The 2025 Breakthrough Prize in Fundamental Physics was awarded to the members of CERN's Large Hadron Collider collaborations: LHCb, ALICE, ATLAS and CMS, "For detailed measurements of Higgs boson properties confirming the symmetry-breaking mechanism of mass generation, the discovery of new strongly interacting particles, the study of rare processes and matter-antimatter asymmetry, and the exploration of nature at the shortest distances and most extreme conditions at CERN's Large Hadron Collider."

[Read more →](#)

VU's Biomedical Tech & Physics Master's Tops Rankings in Keuzegids Masters 2025

The Master's programme in Biomedical Technology and Physics at Vrije Universiteit Amsterdam has been recognized as one of the best in its field according to the Keuzegids Masters 2025. This prestigious distinction shows our department commitment to providing top-tier education and affirms the hard work and dedication of our faculty and students.

The Keuzegids Masters 2025, published on March 27, 2025, assesses Master's programmes across the Netherlands, evaluating them on various criteria including student satisfaction, quality of education, and career prospects. Achieving this recognition speaks volumes about the positive atmosphere and the high-quality curriculum that our department offers.

[Read more →](#)

Assoc. Prof. Imran Avci receives €1 Million euro NWO Funding

Assoc. prof. Imran Avci from the Biophotonics and Medical Imaging Group at Vrije Universiteit Amsterdam has been awarded a €1 million funding from the NWO Open Technology Programme for her pioneering work on the SPHOTED project. This pres-

tigious project aims to revolutionize photonic processors for smart edge devices by introducing a radically new material, thin-film BTO, on a scalable photonic platform. The SPHOTED project is set to develop single-chip, low-power photonic processors that are not only more efficient but also significantly more advanced than current technology.

[Read more →](#)



Capsule Photonics Wins the Venture Challenge Winter 2024/2025

Capsule Photonics, a project led by **prof. dr. Johannes de Boer** and **post-doctoral researcher dr. Anouk Post**, has been declared the winner of the Venture Challenge Winter 2024/2025. The announcement was made at the recent Innovation for Health conference, highlighting the team's outstanding contribution to medical technology. Capsule Photonics has developed an innovative diagnostic tool called LightUp, a capsule endoscope. This advanced device is capable of creating microscopy-like images to detect cancer biomarkers effectively. It utilizes a combination of Optical Coherence Tomography and targeted fluorescence imaging technologies, allowing for full 360-degree and subsurface visualization of the esophagus.



Dr. David Dulin receives NWO grant

Dr. David Dulin of Physics and Living section has been awarded an NWO Open Competition Domain Science-M grant for his research on the mechanisms of ribosomal RNA synthesis. **Tell me how it begins, I will tell you how it ends: catching transcription at the start** - To function, our cells need proteins, which are made by ribosomes, which are partly constituted of ribosomal RNAs synthesized in our cells by RNA polymerase 1 (Pol I). Pol I activity is essential during cell growth, and central in the development of many cancers. Ribosome assembly is mainly regulated at the start of ribosomal RNA synthesis by Pol I. Here, Dulin will employ cutting edge biophysics techniques to reveal how this process is controlled one Pol I molecule at a time.

[Read more →](#)



Imran Avci Wins the 2025 VU Faculty of Science Valorisation Award

Assoc. prof. Imran Avci from the Biophotonics and Medical Imaging Group, has been awarded Vrije Universiteit Amsterdam Faculty of Science Valori-

Revolutionizing the Einstein Telescope Design

This initiative is supported by a significant 3 million euro grant by The Dutch Research Council (NWO), part of a broader national initiative to advance the Einstein Telescope, which was unveiled last September. A new chapter in the development of the Einstein Telescope is set to begin as a dedicated team comprising six PhD students and six postdoctoral researchers embarks on enhancing the instrument's design. Stationed in Maastricht and Amsterdam, the team will be embedded in prominent research groups led by **prof. dr. Andreas Freise** and Stefan Hild.



sation Award 2025! This award recognizes her outstanding contributions to innovation, entrepreneurship, and the societal impact of her research.

[Read more →](#)

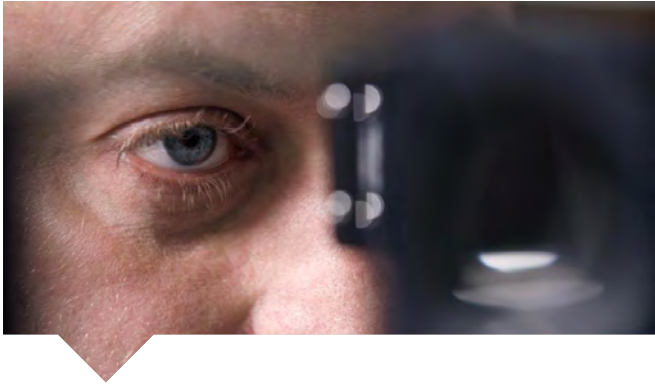
NWO funding for advanced light-induced degradation studies

The team further consists of Prof. Govert Somsen and **assoc. prof. Freek Arie** from the Division of Bioanalytical Chemistry and the Section Biophotonics and Medical Imaging of VU, respectively, and Dr Saer Samanipour and Dr Bob Pirok from the Analytical Chemistry Group at HIMS-UvA, are part of a multidisciplinary research team at the Vrije Universiteit (VU) and University of Amsterdam (UvA) that has acquired €1.1 million in funding through the Open Technology Programme of the Domain Applied and Engineering Sciences of the Dutch Research Council NWO. The 4-year research project dubbed Con-



SOLIDATE concerns the 'Controlled Study Of Light Induced Degradation by Advancing Technology' and is co-funded by AstraZeneca, AkzoNobel, and the Cultural Heritage Agency.

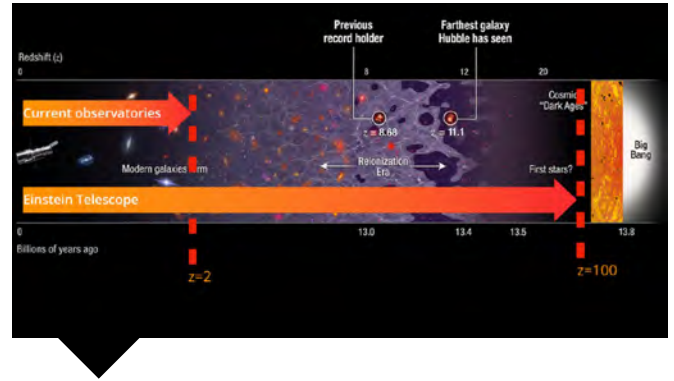
[Read more →](#)



ERC Consolidator Grant for Dierck Hillmann

The European Research Council (ERC) has awarded physicist **assoc. prof. Dierck Hillmann** a Consolidator Grant for his project "FunMicroRetina." Hillmann aims to enhance the resolution of images of the retina. **Dierck Hillmann** is working on making super-detailed pictures of the retina, the part at the back of your eye that helps you see. Normally, they use light that goes through the pupil to take those pictures, but that limits how sharp they can get (the so-called diffraction at the pupil limits the resolution)—kind of like trying to take a photo through a small keyhole. Hillmann uses near-infrared light for this purpose. Hillmann explains: "It's all about the angles at which light can reach the back of the eye and the angles of the reflected light that can be detected. These factors determine the resolution, or in other words, the smallest details that our imaging technique can reveal."

[Read more →](#)



€1.375M Award for Einstein Telescope Led by Conor Mow-Lowry

The six partners of the Sensor Engineering for Noise and Vibration Isolation and Damping in the Einstein Telescope (SENVIDET) consortium has been awarded a grant to develop advanced vibration damping technologies critical for the operations of the Einstein Telescope. This grant, part of the Einstein Telescope valorization program for high-tech companies, is funded by the National Growth Fund to foster innovation in Dutch high-tech sectors. VU physicist **assoc. prof. Conor Mow-Lowry** is the Nikhef (National Institute for Subatomic Physics) lead for this consortium.

[Read more →](#)

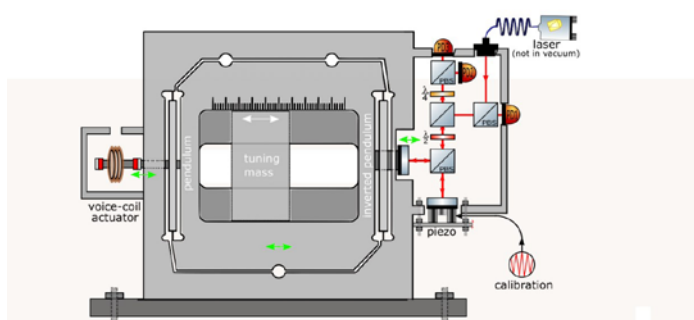


NWO grant for development of innovative technologies Einstein Telescope

Listening to collisions of black holes from across the universe is possible through the Einstein Telescope. With the NWO ENW-XL Open Competition grant, VU Amsterdam scientists **prof. dr. Andreas Freise** and **assoc. prof. Conor Mow-Lowry** are developing technologies essential to enable the telescope's sensitivity. The Einstein Telescope will be Europe's Gravitational Wave observatory guaranteeing unprecedented observing capacity for most of the the 21st century, being able to listen for instance to colliding black holes from the whole Universe.

Bringing ChiPS (Compact High-Performance Sensors) to ASML and Einstein Telescope

VU physicists **dr. Joris van Heijningen** and **assoc. prof. Conor Mow-Lowry** receive subsidy of about 2 M€ with a collaboration between Nikhef and TU Delft and industry partners ASML, Demcon, Settels Savenije Group of Companies, IBS Precision Engineering, and IDE. Those in sensor development have all done it: squeeze out that one nice result by tweaking and babysitting. The next day, the sensor would need re-calibrating or re-alignment. This proposal is all about taking the best-performing sensing and control techniques and combine them into horizontal and vertical inertial sensor concepts that we will then take to the next level: compact, robust and ultra-precise inertial sensors.



NWO finances groundbreaking fundamental research projects

21 research consortia, three of whom are from Physics and Astronomy department, receive funding from the ENW-XL Open Competition to reach a breakthrough. Physicist **dr. Iddo Heller**, and physicist **prof. dr. Andreas Freise**, together with **assoc. prof. Conor Mow-Lowry** are closely involved in the research.

[Read more →](#)

All-optical Approach for Studying Human Neuronal Signal Processing (ELEANOR)

In the NWO-ENW Open Competition M2 call, **assoc. prof. Imran Avci** from the Biophotonics and Medical Imaging Group, has been awarded an €800,000 Open Competition M2 grant for the "ELEANOR" project. This project is a collaboration with Prof. Richard van Wezel and Dr. Naoki Kogo from the Donders Institute at Radboud University. Through an innovative all-optical approach, the ELEANOR project aims to study the role of dendritic and synaptic properties of human neurons in transforming an ensemble of synaptic inputs into an output pattern.

[Read more →](#)

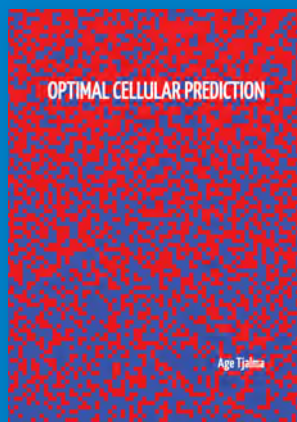
Baraa Alsaadi Won Best Presentation Award for AI-Enhanced Fracture Detection

Bachelor student of Medical Natural Sciences **Baraa Alsaadi**, who is doing an internship at the Department of Radiology and Nuclear Medicine at Meander Medical Center, won the award for the best presentation on her research into the added value of GLEAMER. GLEAMER is an AI program for recognizing fractures that is now used in the ER and in other departments within the hospital.

[Read more →](#)



Recent PhD Theses



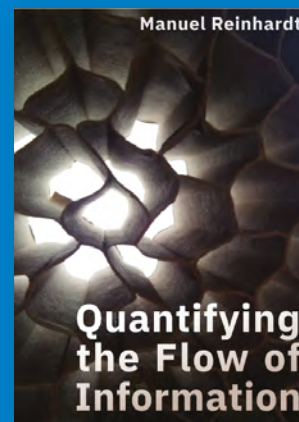
Age Jens Tjalma **Optimal Cellular Prediction**

Promotor: prof. dr. P.R. ten Wolde

Defence: 19 June 2025

Section: Physics of Living Systems

More information on the thesis



Manuel Reinhardt **Quantifying the Flow of Information**

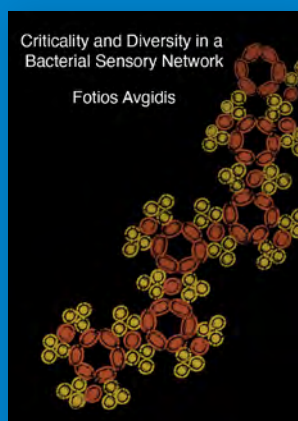
Promotor: prof. dr. P.R. ten Wolde

Copromotor: prof. dr. G. Tkacik

Defence: 13 June 2025

Section: Physics of Living Systems

More information on the thesis



Fotios Avgidis **Criticality and Diversity in a Bacterial Sensory Network**

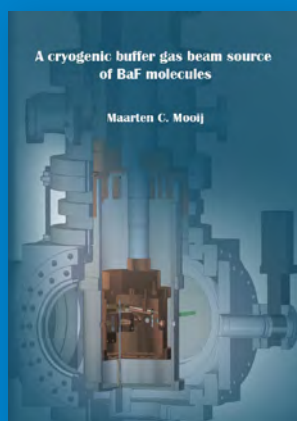
Promotor: prof. dr. T.S. Shimizu

Copromotor: prof. dr. T.S. Shimizu

Defence: 6 June 2025

Section: Physics of Living Systems

More information on the thesis



Maarten Mooij **A cryogenic buffer gas beam source of BaF molecules**

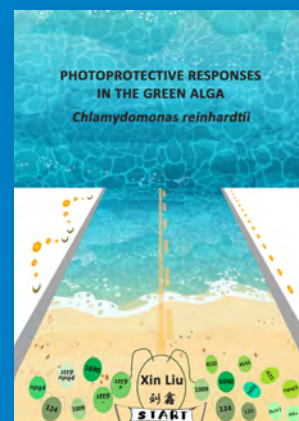
Promotor: prof. dr. H.L. Bethlem, prof. dr.

W.M.G. Ubachs

Defence: 3 June 2025

Section: Quantum Metrology
and Laser Applications

More information on the thesis



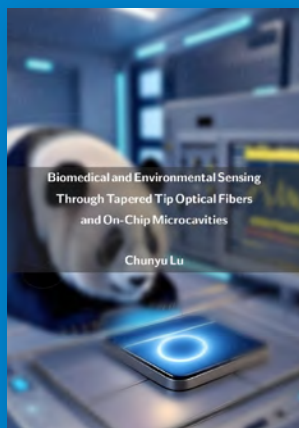
Xin Liu **Photoprotective responses in the green alga *Chlamydomonas reinhardtii***

Promotor: prof. dr. R. Croce

Defence: 28 May 2025

Section: Biophysics of Photosynthesis

More information on the thesis



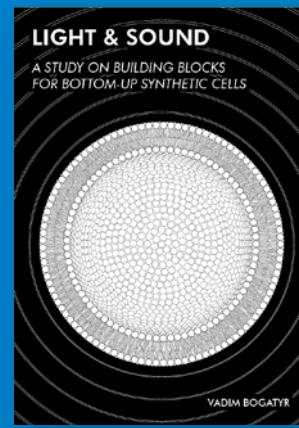
Chunyu Lu
Biomedical and Environmental Sensing through Tapered Tip Optical Fibers and On-chip Microcavities

Promotor: dr. F. Arieze
 Copromotor: dr. B.I. Avci
 Defence: 28 May 2025
 Section: Biophotonics & Medical Imaging
[More information on the thesis](#)



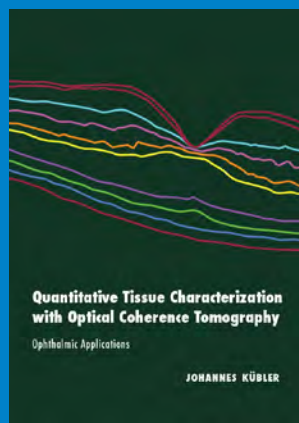
Wouter Mul
Shining light on motor regulation in the cilium

Promotor: prof. dr. ir. E.J.G. Peterman
 Copromotor: dr. ir. I. Heller
 Defence: 17 April 2025
 Section: Physics of Living Systems
[More information on the thesis](#)



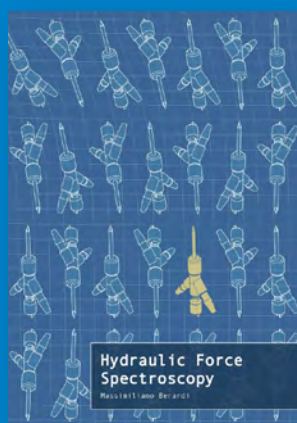
Vadim Bogatyr
Light & sound

Promotor: prof. dr. ir. G.J.L. Wuite
 Copromotor: prof. dr. ir. E.J.G. Peterman
 Defence: 10 April 2025
 Section: Physics of Living Systems
[More information on the thesis](#)



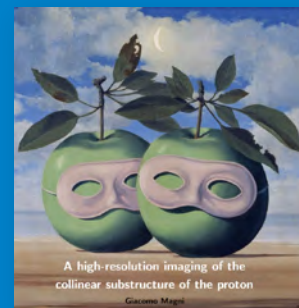
Johannes Kuebler
Quantitative Tissue Characterization with Optical Coherence Tomography

Promotor: prof. dr. J.F. de Boer
 Copromotor: prof. dr. A. Amelink
 Defence: 08 April 2025
 Section: Biophotonics & Medical Imaging
[More information on the thesis](#)



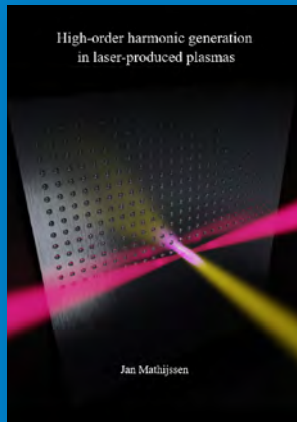
Massimiliano Berardi
Hydraulic Force Spectroscopy

Promotor: prof. dr. ir. G.J.L. Wuite
 Copromotor: dr. B.I. Avci
 Defence: 04 April 2025
 Section: Biophotonics & Medical Imaging
[More information on the thesis](#)



Giacomo Magni
A high-resolution imaging of the collinear substructure of the proton

Promotor: prof. dr. J. Rojo
 Copromotor: dr. M. Senghi Soares
 Defence: 04 April 2025
 Section: (Astro-) Particle Physics
[More information on the thesis](#)



Johannes Mathijssen High-order harmonic generation in laser-produced plasmas

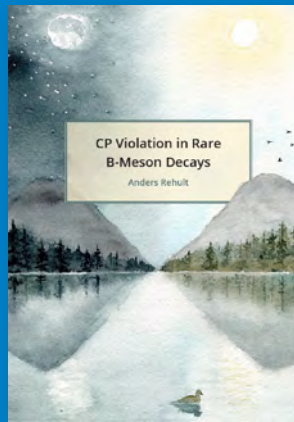
Promotor: dr. S.M. Witte,

prof. dr. K.S.E. Eikema

Defence: 25 March 2025

Section: Quantum Metrology
and Laser Applications

More information on the thesis



Anders Rehult CP Violation in Rare B-Meson Decays

Promotor: prof. dr. R. Fleischer

Copromotor: dr. K.K. Vos

Defence: 14 March 2025

Section: (Astro-) Particle Physics

More information on the thesis



Alexandra Mitchell HoQI - Low-noise Interferometric Sensors for the Future of Gravitational Wave Detectors

Promotor: prof. dr. A. Freise

Copromotor: dr. C.M. Mow-Lowry

Defence: 06 March 2025

Section: (Astro-) Particle Physics

More information on the thesis



Liam Gerard O'Shaughnessy On the 3D Social Behavior of Zebrafish

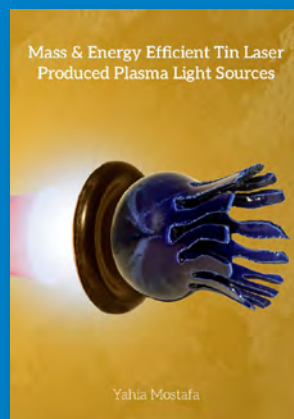
Promotor: dr. Greg Stephens

Copromotor: prof. dr. Erwin Peterman

Defence: 20 January 2025

Section: Physics of Living Systems

More information on the thesis



Yahia Mostafa Mass & Energy Efficient Tin Laser Produced Plasma Light Sources

Promotor: prof. dr. Oscar Versolato

Copromotor: dr. John Sheil

Defence: 10 January 2025

Section: Physics of Nanolithography

More information on the thesis



Jongejan Jacobus ter Hoeve Fingerprinting New Physics with Effective Field Theories

Promotor: prof. dr. Juan Rojo

Copromotor: prof. dr. Wouter Verkerke

Defence: 8 January 2025

Section: (Astro-) Particle Physics

More information on the thesis



Interview

Juan Rojo, New Head of Department

As the new head of the department, what is your vision for the future of Physics and Astronomy at VU?

Our department is characterised by a strong and successful research-focused strategy and maintaining this profile will be our main priority. This will not be a walk in the park, given ongoing developments in the national and international landscape, with many sources of scientific funding drying up, and with the decrease in university student numbers compounding to the challenge. Nevertheless, our track record and international leadership makes me confident that will keep this strong research focus, supported by a broad portfolio of external funding making us resilient and future-proof, and furthermore well aligned with the VU strategic vision.

In this endeavour, we will benefit from our long-standing collaborations and partnerships with other education and research institutes (ARCNL, Nikhef, UT, UvA, AUMC, ...) while at the same time developing novel synergies both within the Faculty of Science and with other research centres in The Netherlands and abroad. In addition, emphasiz-

ing our strong connections with technological and commercial applications of fundamental research for industry and valorisation efforts, from startups to consolidated companies, also represents a core ingredient of our strategy for the coming period.

What do you see as the biggest challenges and opportunities for the department in the coming years, and how do you plan to address them?

Let me start by the opportunities, since there are many of them, and I can only name a few. First of all, we want to fully exploit our fantastic new VU Research Building, where we have moved in recently, as a central hub to kick-start new scientific collaborations and also to increase our exposure and visibility to the student population. Second, to further highlight the cutting-edge experimental and applied physics research that is carried out in our department, demonstrating its many connections to society, from ASML to the hospitals and from lasers and photonic chips to energy harvesting. Third, through our partnership with Nikhef, we want to play a key role in the future of particle physics at CERN and

"Our department is characterised by a strong and successful research-focused strategy and maintaining this profile will be our main priority."

of gravitational wave physics with Einstein Telescope – the latter being potentially the single largest scientific investment in the history of the Netherlands and where the VU plays a core role both in its management and its scientific exploitation. Fourth, by exploring new strategic collaborations strengthening national and European defence efforts, for example by developing novel materials or hacking-resilient communication platforms.

The main challenges have been listed above, namely the decrease in science funding combined with lower student numbers for some of our educational programs. I am also rather concerned by the decrease in political and societal support for universities and for science in general, recovering this support is far from obvious and needs a targeted effort from our academic community. In general, the higher education and research ecosystem in the Netherlands has been extremely successful and punching above its weight, as illustrated by the comparatively large share of ERC grants hosted by NL, for decades, but it is far from obvious that this trend can be continued. Therefore, ensuring that our Department of Physics and Astronomy, and the VU Amsterdam in general, remain an attractive and competitive employer for international scientific top talent should be very high in our list of priorities for the coming years.

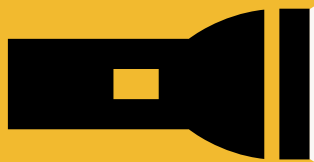
You're known for being remarkably fast at replying to emails and messages – almost the speed of light! Does your work in Astro particle physics give you some secret insight into time management, or is it just pure efficiency?

Well, my philosophy is that replying to an email with an "imperfect" or partial answer is always better than a de-

layed "perfect" reply (or no reply at all). Sometimes a short reply to acknowledge the receipt and the promise or a more complete reply in the future suffices – it conveys the message that colleagues are being heard and taken seriously. Of course, in many cases a full-fledged reply to a query will take much longer, but this should never hinder our communication – being honest and transparent with the knowledge we have now and the actions we plan to undertake is it takes to reassure people. Furthermore, at least in my field (particle physics) we use chat messaging tools such as Slack, Mattermost, or Teams all the time for speedy, low-threshold communication among us all the time, so I guess I sometimes treat email in the same manner.

On a personal note, what is a hobby or interest you have outside of academia that might surprise people?

I have always enjoyed sports. They help me keeping my sanity by enabling me to decouple from the many pressures that a role such as head of department has associated with. I regularly run 10 km races, with a long-term ambition of mine being at some point being able to run a marathon, and I also train weekly for CrossFit. My new goal now is to run a Hyrox race, a new type of competitive indoor fitness race that combines functional strength exercises (such as weight lunges, wall balls, sled push & pull, ski & rowing ...) with running (8 km). I will hopefully run my first Hyrox race in September and I am really excited about it, let's see if I make it to the end!



Highlighted Papers

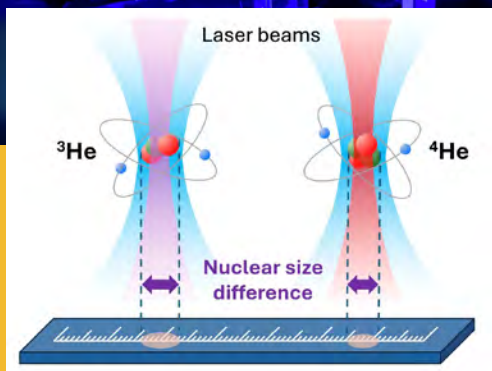
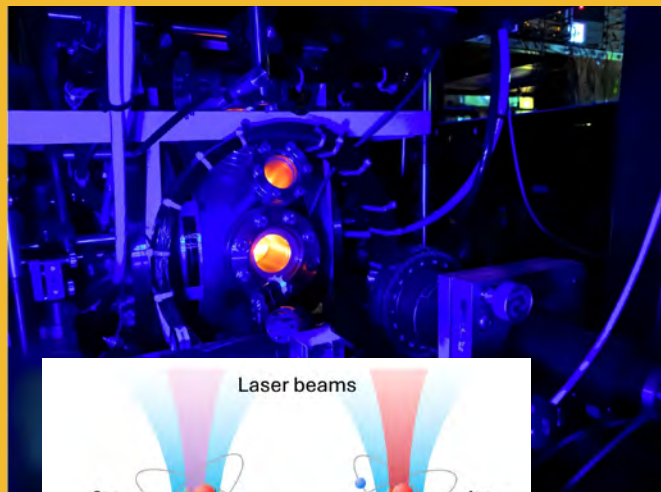
Size matters: the most accurate nuclear size comparison between helium isotopes

A team led by prof. dr. Kjeld Eikema of the Quantum Metrology and Laser Applications group at the VU used advanced

laser techniques to compare the nuclear charge radius of rare helium-3 with that of common helium-4 [1]. In effect this is a comparison between the helion particle (the nucleus of helium-3) and the alpha particle (nucleus of helium-4). Such measurements contribute to searches for yet unknown effects beyond our current understanding of physics, known as the Standard Model. [Read more](#)

Y. van der Werf et al., Alpha and helion particle charge radius difference determined from quantum-degenerate helium. Science 388,850-853(2025).

[Read paper online](#)



The LHCb Collaboration Unveils Key Asymmetry in Baryons at CERN

In a significant discovery that adds a crucial piece to the matter-antimatter puzzle, the LHCb collaboration at CERN has recently reported a groundbreaking observation of asymmetry in baryons. This finding was announced at the prestigious annual Rencontres de Moriond conference in La Thuile, Italy. The LHCb experiment, a cornerstone project at the Large Hadron Collider (LHC), analyzed extensive data revealing that baryons—particles like the protons and neutrons in atomic nuclei—exhibit a distinct asymmetry. This asymmetry is a manifestation of what physicists call “charge-parity (CP) violation,” which suggests that the laws of physics are not always mirror symmetric when it comes to matter and antimatter. The Dutch participation in LHCb experiment is lead by assoc. prof. Mara Senghi Soares, from (Astro-) Particle Physics section and member of NIKHEF, and counts four participating institutes (VU, RUG, UM and NWO-i Nikhef). [Read more](#)



The dynamic life of single proteins in signaling hubs of living worms

High-resolution single-molecule imaging in the sensory neurons of living roundworms uncovers the intricate mechanics of intracellular transport in sensory cilia. Researchers from a lab in the Physics of Living Systems Section, led by prof. dr. Erwin J. G. Peterman, have developed an elegant fluorescence microscopy approach called small-window illumination microscopy (SWIM) that allow them to visualize the fast intracellular dynamics of individual protein molecules inside neurons of living *Caenorhabditis elegans* worms, over long durations of time (>1hr).

[Read more](#)

Mitra, A., Loseva, E. & Peterman, E.J.G. IFT cargo and motors associate sequentially with IFT trains to enter cilia of *C. elegans*. *Nat Commun* 15, 3456 (2024).

[Read paper online](#)

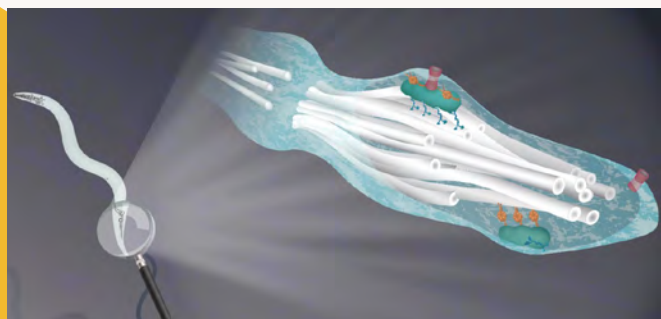


Image courtesy: Elizaveta Loseva

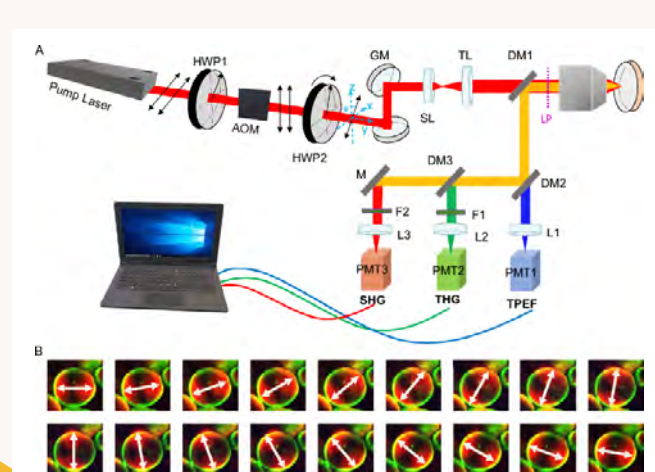
Multiscale investigation of collagen structure in human skin and gel matrices using polarization resolved second harmonic generation microscopy

Collagen is critical to the structure and function of skin tissues, with the collagen I/III ratios influencing fibrillogenesis, fiber organization, and skin mechanics. Abnormal collagen organization, such as in fibrosis or scar tissue, compromises both skin functionality and aesthetics. In this study, we employed label-free polarization resolved second harmonic generation (PSHG) microscopy to investigate collagen structure in artificial collagen matrices with various Col I/III ratios at the fibril scale (~1 to μm) and in ex vivo human healthy and scarred skin at the fiber scale (~10 to μm). Complementary third harmonic generation (THG) microscopy provided additional structural information.

[Read more](#)

Zhou, M., Gomes, M.P., Elgersma, A. et al. Multiscale investigation of collagen structure in human skin and gel matrices using polarization resolved second harmonic generation microscopy. *Sci Rep* 15, 20025 (2025).

[Read paper online](#)



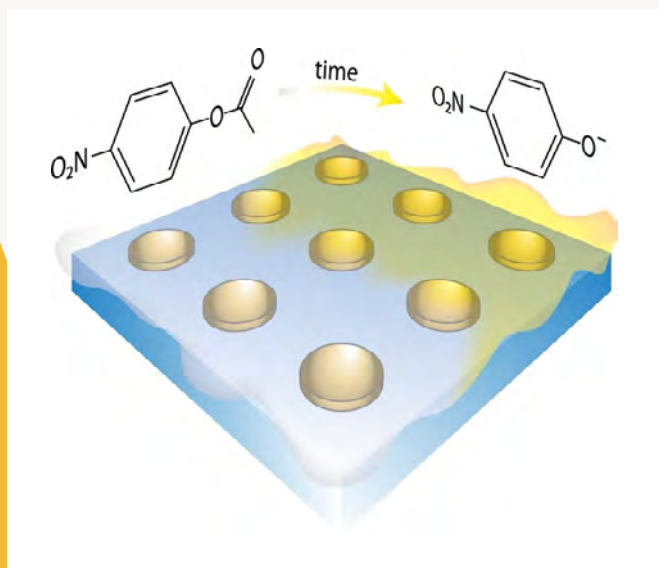
Polaritonic Chemistry Enabled by Non-Local Metasurfaces

Vibrational strong coupling can modify chemical reaction pathways in unconventional ways. Thus far, Fabry-Perot cavities formed by pairs of facing mirrors have been mostly utilized to achieve vibrational strong coupling. In this study, we demonstrate the application of non-local metasurfaces that can sustain surface lattice resonances, enabling chemical reactions under vibrational strong coupling. We show that the solvolysis kinetics of para-nitrophenyl acetate can be accelerated by a factor of 2.7 by strong coupling to the carbonyl bond of the solvent and the solute with a surface lattice resonance.

[Read more](#)

F. Verdelli, Y.-C. Wei, K. Joseph, M. S. Abdelkhalik, M. Goudarzi, S. H. C. Askes, A. Baldi, E. W. Meijer, J. Gomez Rivas, *Angew. Chem. Int. Ed.* 2024, 63, e202409528.

[Read paper online](#)



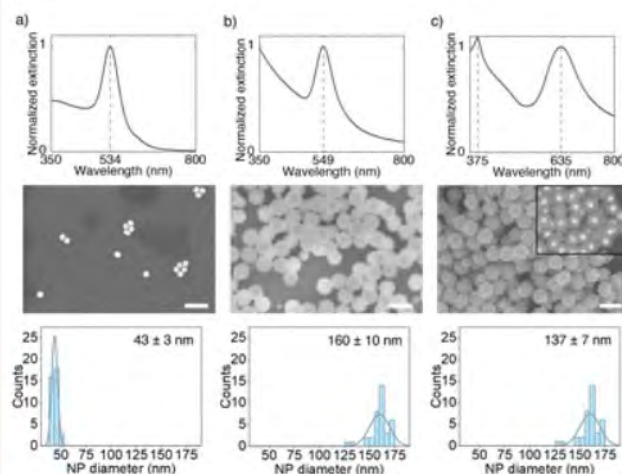
Tailoring core size, shell thickness, and aluminium doping of Au@ZnO core@shell nanoparticles

Plasmonic materials, such as gold nanoparticles (AuNPs), exhibit significant extinction and near-field enhancement across the visible and near-infrared spectrum, attributable to localized surface plasmon resonances (LSPRs). Epsilon-near-zero (ENZ) materials, such as aluminium doped zinc oxide (AZO) are known in non-linear optics for their ability to generate and manipulate light-matter interactions through processes like higher harmonic generation. Combining doped ZnO with plasmonic materials therefore holds promise for enhancing non-linear efficiencies and tuning their operational wavelengths. To date, however, only top-down structures based on plasmonically decorated thin ENZ films have been realized, and no colloidal and scalable route to obtain these hybrid materials has been reported yet.

[Read more](#)

Quynh Nguyen, Attilio Zilli, Michele Celebrano, and Andrea Baldi, *J. Mater. Chem. C* 2025, 13, 8302-8309

[Read paper online](#)



News & Announcements

Celebrating 25 Years of Excellence at VU Amsterdam!

As Physics and Astronomy department, we proudly celebrate prof. dr. Marloes Groot, from Biophotonics & Medical Imaging section, and her remarkable 25-year journey at Vrije Universiteit Amsterdam. Not only is Marloes a dedicated scientist, educator, and leader, but she also holds the historic title of being the first Dutch female Physics Professor in the Netherlands. Marloes' career is a testament to pioneering spirit and relentless curiosity. [Read more →](#)



Oscar Versolato new Professor of EUV plasma processes

As of 17 February, physicist Oscar Versolato has been appointed Professor of EUV plasma processes. His chair is embedded in the Physics and Astronomy department.

[Read more →](#)



Exploring Dark Matter with Dr. Laura Dreissen

Dr. Laura Dreissen tells about her research on dark matter in a special session of 'de nacht van...' on radio 1, aired live from the radio telescope in Dwingeloo. [De Nacht van KRO-NCRV - Listen here →](#)

Chase Broedersz appointed URC professor

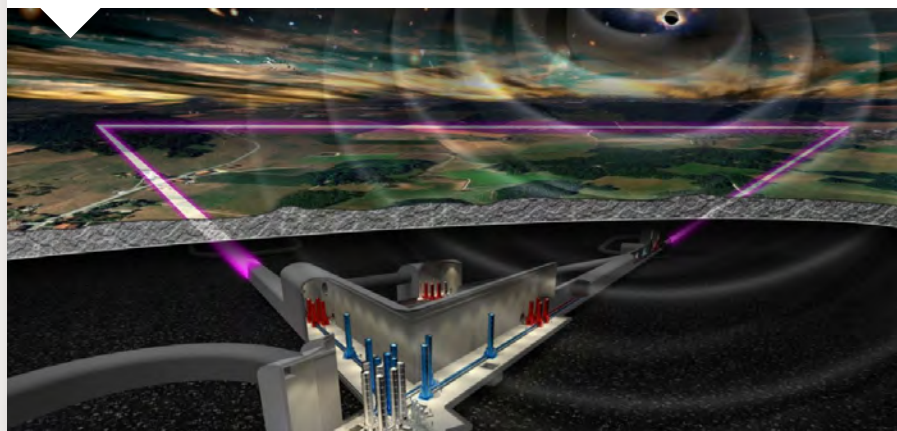
The Executive Board appoints physicist Chase Broedersz as professor of Theoretical Physics on a University Research Chair (URC), effective from September 1. [Broedersz](#) is one of the world's leading experts in the field of Theoretical Physics of Life. His research aims to understand the physics of biological functions, and how these are affected by diseases or genetic modifications. He combines traditional theoretical methods with modern data-driven methods (e.g. machine learning) to tackle the complexity of living systems.

[Read more →](#)



Einstein Telescope Declared National Priority by Dutch Government

The Dutch cabinet has recently prioritized the Einstein Telescope, marking it as a national priority project, highlighting its significance in the realm of scientific advancement. This prioritization ensures that the feasibility of constructing this monumental project will be expedited across all ministries. In a collaborative effort, the central government is joining forces with the Province of Limburg and the Dutch Research Council (NWO) to work closely with German and Belgian partners. This initiative aims to host the Einstein Telescope, the largest scientific construction endeavor to date, in the Euregio Meuse-Rhine border area. As part of these efforts, the Einstein Telescope Netherlands (ET-NL) has been established to coordinate and propel the project forward in the Netherlands. [Read more →](#)

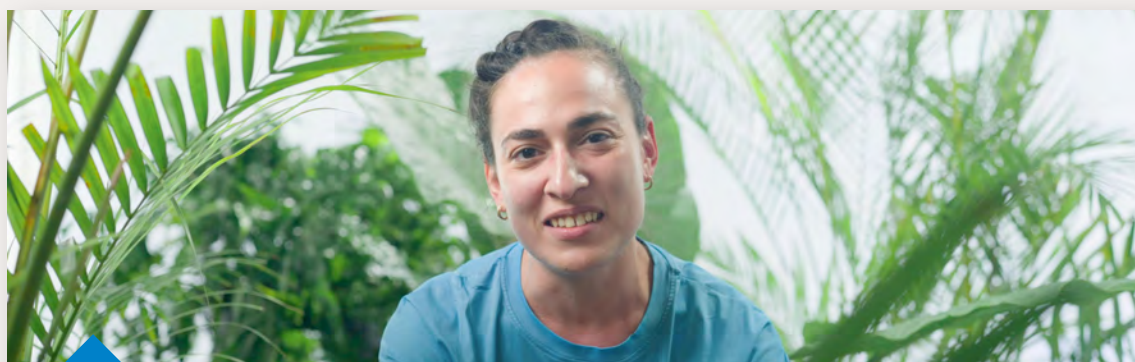


SAVE the DATE! We're Joining the Weekend of Science 2025!

Physics and Astronomy department is excited to take part in the Weekend of Science 2025, a nationwide event celebrating science and innovation. The activities will take place on Saturday, 4 October 2025 in our new V0 Building. Stay tuned for more details — we look forward to welcoming curious minds of all ages!

Physics and Astronomy Colloquium Dates

- September 3, 2025
- October 1, 2025
- November 5, 2025
- December 3, 2025



Volha Chukhutsina elected to the board of the European XFEL User Organization

Physicist dr. Volha Chukhutsina of Biophysics of Photosynthesis has been elected as the SPB/SFX beamline Representative on the Executive Committee of the User Organization of European XFEL (UOEC). The European XFEL is a world-leading research facility with unparalleled capabilities, producing ultrashort X-ray flashes 27,000 times per second, with a brilliance a billion times greater than traditional X-ray sources. As the largest X-ray laser in the world, it offers extraordinary opportunities for scientific and industrial research, enabling the exploration of previously inaccessible areas of study. [Read more →](#)

More information

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