



**Sven de Man**  
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## EDUCATION

### Vrije Universiteit Amsterdam

- PhD in Physics, 2006 – present.
- Master in Condensed Matter Science, June 2007, Cum Laude.
- Bachelor in Physics and Astronomy, October 2004, Cum Laude.
- Propaedeutics Mathematics and Statistics, August 2002.
- Propaedeutics Physics and Astronomy, August 2001, Cum Laude.

### Gymnasium, “De Meergronden”, Almere

Subjects: Dutch, English, French, German, Latin, Greek, Chemistry, Physics, Mathematics, and Economics. June 2000, Cum Laude, at the age of 16.

## RESEARCH

### Casimir effect measurements

**September 2006 – present**

I improved the Atomic Force Microscope based force measurement apparatus in terms of stability, force resolution and distance accuracy. This is done by making extensive use of modulation techniques and lock-in amplifiers. We currently have pN force resolution and nm absolute distance accuracy with unprecedented stability: we can accumulate data over weeks and have mechanical drifts that are >100x smaller than other groups that measure the Casimir effect. Data acquisition is in progress. (PhD thesis)

### Casimir effect with Hydrogen Switchable Mirrors

**June 2005 – January 2007**

I made precise calculations of the Casimir force between hydrogen switchable mirrors. The result gives more insight in measurements recently performed at Harvard University (Iannuzzi, Lisanti, Capasso, 2004 PNAS **101** 4019). These calculations consist of modeling dielectric properties and computing Casimir forces for multilayered structures. (de Man and Iannuzzi, New Journal of Physics **8** (2006))

I designed an Atomic Force Microscope based experiment for systematic studies of the Casimir force between switchable mirrors; measurements are running. This work was awarded a 9.5 on a scale of 1 to 10.

### Pattern formation in magnetic systems

**March – July 2005**

The forming of patterns in magnetic systems can be modeled with a simple Hamiltonian. Calculations in Fourier space by E. A. Jagla resulted in stripelike domain patterns (Phys. Rev E. **70**, 046204, 2004). I performed calculations with the same Hamiltonian in normal space, and obtained striped patterns too, but without domains. Using FFT transforms of the resulting spin images I demonstrated that the domain formation as seen by Jagla could be due to the numerical procedure, and not to a property of the used Hamiltonian. (awarded a 10 on a scale of 1 to 10)

### **Catalyst for hydrogen absorption: Ni and NiO**

**Summer 2003**

One of the obstacles for using metal-hydride storage systems is the need for rare, and thus expensive, catalysts like Pd and Pt. Together with A. Borgschulte, Ni and NiO thin films were examined on catalytic activity, using Scanning Tunneling Microscopy, Auger Electron Spectroscopy and optical transmission measurements. This research resulted in my Bachelor thesis that was awarded a 9 on a scale of 1 to 10. (Borgschulte, Gremaud, de Man, *et al.*, Appl. Surf. Sci. **253** (2006) 1417-1423)

## **TEACHING EXPERIENCE**

### **Electricity and Magnetism**

**February – May 2009**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *Electricity and Magnetism*. (Teaching assistant, dr. R. J. Wijngaarden)

### **Electricity and Magnetism**

**February – May 2008**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *Electricity and Magnetism*. (Teaching assistant, dr. R. J. Wijngaarden)

### **Electricity and Magnetism**

**February – May 2007**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *Electricity and Magnetism*. (Teaching assistant, dr. R. J. Wijngaarden)

### **From Quantum to Matter**

**November – December 2006**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *From Quantum to Matter*. I was evaluated to be the best assistant again, like the year before. (Teaching assistant, Prof. dr. R. Griessen and Prof. dr. C. Gooijer)

### **From Quantum to Matter**

**November – December 2005**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *From Quantum to Matter*. (Teaching assistant, Prof. dr. R. Griessen and Prof. dr. C. Gooijer)

### **Physics practicum**

**August 2003 – December 2004**

Department of Physics and Astronomy, Vrije Universiteit Amsterdam; *Physics practicum II and III, for students Medical Natural Sciences*. (Teaching assistant, Dr. P. Blankert)

### **Science Unlimited at the NEMO, Amsterdam**

**June 2005**

For the World Year of Physics, a large *show-and-tell* event (15,000 guests) was organized in Amsterdam by Dutch universities and industries. I presented a table-top experiment to illustrate the Coriolis effect.

## **ADDITIONAL INFORMATION**

### **Awards**

- Physica propaedeutics prize 2001, Holland Society for the Sciences, Haarlem.
- Veeco user meeting poster prize 2007

### **Professional skills**

- Atomic Force Microscopy (contact mode, tapping mode, electric-field imaging)
- Scanning Tunneling Microscopy and Spectroscopy
- Auger Electron Spectroscopy
- Ultra High Vacuum technology
- Design, fabrication and test of elementary electronic circuits
- Nanopositioning and high precision measurement techniques

### **Software knowledge**

Mathematica, C, C++, Objective C, LaTeX, MATLAB, Microsoft Windows (all versions), OriginPro, JAVA, Maple, Igor Pro, LabView, Microsoft Office, and Mac OS X.

## **REFERENCES**

- Prof. dr. Ronald Griessen  
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## PUBLICATIONS

1. A. Borgschulte, R. Gremaud, **S. de Man**, R.J. Westerwaal, J.H. Rector, B. Dam, and R. Griessen, *High-throughput concept for tailoring switchable mirrors*, Applied Surface Science **253** (2006) 1417-1423
2. **S. de Man** and D. Iannuzzi, *On the use of Hydrogen Switchable Mirrors in Casimir force experiments*, New Journal of Physics **8** (2006) 235 (selected for inclusion in IOP Select)
3. D. Iannuzzi, S. Deladi, J. Berenschot, **S. de Man**, K. Heeck, and M. Elwenspoek, *Fiber-top atomic force microscope*, Rev. Sci. Instr. **77** (2006) 106105 (selected for inclusion in Virtual J. Nanoscale Sci. & Tech.)
4. D. Iannuzzi, K. Heeck, M. Slaman, **S. de Man**, J. H. Rector, H. Schreuders, J. W. Berenschot, V. J. Gadgil, R. G. P. Sanders, M. C. Elwenspoek, and S. Deladi, *Fibre-top cantilevers: design, fabrication, and applications*, Meas. Sci. Tech. **18** (2007) 3247
5. A. A. Said, M. Dugan, **S. de Man**, and D. Iannuzzi, *Carving fiber-top cantilevers with femtosecond laser micromachining*, J. Micromech. and Microeng. **18** (2008) 035005
6. R. Gremaud, M. Gonzalez-Silveira, Y. Pivak, **S. de Man**, M. Slaman, H. Schreuders, B. Dam, and R. Griessen, *Hydrogenography of PdH<sub>x</sub> thin films: influence of H-induced stress relaxation processes*, Acta Materialia **57** (2009) 1209-1219.
7. C. J. Alberts, **S. de Man**, J. W. Berenschot, V. J. Gadgil, M. C. Elwenspoek, and D. Iannuzzi, *Fibre-top refractometer*, Meas. Sci. Tech. **20** (2009) 034005
8. D. Iannuzzi, **S. de Man**, C. J. Alberts, J. W. Berenschot, M. C. Elwenspoek, A. A. Said, and M. Dugan, *Fibre-top micromachined devices*, Proc. SPIE **7004** (2008) 7004-277
9. K. Smith, **S. de Man**, H. Zeijlemaker, A. A. Said, M. Dugan, and D. Iannuzzi, *Fiber-top atomic force microscope: a worthwhile challenge*, OECC/ACOFT 2008 Conference
10. **S. de Man**, K. Heeck, and D. Iannuzzi, *No anomalous scaling in electrostatic calibrations for Casimir force measurements*, Phys. Rev. A **79** 024102 (2009)
11. A. Petruşis, J. H. Rector, K. Smith, **S. de Man**, and D. Iannuzzi, *Align-and-shine technique for series production of photolithography patterns on optical fibers*, J. Micromech. and Microeng. **19** (2009) 047001
12. **S. de Man**, K. Heeck, R. J. Wijngaarden, and D. Iannuzzi, *Halving the Casimir force with conductive oxides*, Phys. Rev. Lett. **103** (2009) 040402
13. A. Petruşis, J. H. Rector, K. Smith, **S. de Man**, and D. Iannuzzi, *Align-and-shine photolithography*, Proc. SPIE **7503** (2009) 75036Q
14. G. Gruca, **S. de Man**, M. Slaman, J. H. Rector, and D. Iannuzzi, *Ferrule-top micromachined devices: a new approach to fibre-top technology*, Proc. SPIE **7503** (2009) PDP07
15. **S. de Man**, K. Heeck, R. J. Wijngaarden, and D. Iannuzzi, *Contact potentials in Casimir force setups: an experimental analysis*, submitted to J. Vac. Sc. Technl. B
16. **S. de Man**, K. Heeck, K. Smith, R. J. Wijngaarden, and D. Iannuzzi, *Casimir force experiments in air: two birds with one stone*, accepted by Proceedings of QFEXT09 and International Journal of Modern Physics A
17. G. Gruca, **S. de Man**, M. Slaman, J. H. Rector, and D. Iannuzzi, *Ferrule-top micromachined devices: a new approach to fibre-top technology*, submitted to Meas. Sci. Tech.

## PATENT

1. Iannuzzi, Gruca, de Man: Ferrule-top devices, US Provisional Application No. 61/204,541

## TALKS

1. Fluctuate 08 workshop, Kavli Institute for Theoretical Physics, Santa Barbara, CA, USA (invited visiting scientist November 10-14, 2008)
2. Physics@FOM Veldhoven 2009, Veldhoven, The Netherlands, contributed talk (January 21, 2009)
3. Casimir symposium at CNRS/Université Joseph Fourier, Grenoble, France, invited talk (February 26, 2009)
4. 12<sup>th</sup> International Conference on Non-Contact Atomic Force Microscopy, Casimir Satellite workshop, Yale University, New Haven, CT, USA, contributed talk (August 2009)

## POSTERS

- FOM meeting 2007, Veldhoven, The Netherlands
- Veeco User Meeting 2007 (received poster prize), Amsterdam, The Netherlands
- Casimir workshop 2006, Lorentz Center, Leiden, The Netherlands

## MARKS LIST VRIJE UNIVERSITEIT AMSTERDAM (2000 – 2007)

Casimir force master research project	9.5
Advanced Statistical Physics	10
Science and Technology of Hydrogen in Metals	9.5
Simulation of pattern formation in type-I superconductors	10
Advanced Solid State Physics	10
Electronic Structure and Chemistry of Solids	9
Gravitation and Cosmology (General Relativity)	8.5
Structure of Matter A (Atomic, Elementary particle, and Nuclear physics)	8
Structure of Matter B (Cosmology, Biophysics, and Condensed Matter physics)	8.5
Electrodynamics and Special Relativity	8
Bachelor project in the group of prof. R. Griessen	9
Thermodynamics and Statistical Physics	9
Physics and Health	8
History of Sciences	7.8
Quantummechanics	7.5
Special Functions	7.5
Physics Practicum III	8
Philosophy of science	8.4
Scientific Visualization	8
Classical Mechanics	8.5
Physics Practicum II	8.5
Advanced Calculus	9
Project Mathematics I	8
Project Mathematics II	9
Stochastic theory II	9
Dynamical Systems (chaos theory)	9
Complex function theory	7
Mathematical Analysis I	7
Introduction Applied computer science	9
Electronics and signal processing	7.5
Experiment automation (LabView)	8
Electricity and Magnetism (electrostatics)	6
Orientation on Social Master	7.7
Introduction to Astronomy	7
Linear Algebra	8
Optics	9
Topology	7
Vectorcalculus	9
Physics Practicum I	8.5
Mechanics	8.6
Algebra	8
Special Relativity theory	9
Stochastic theory I	8
Calculus	10
Quantumphysics	10