

Curriculum Vitae

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First name	<i>Petter</i>
Surname	<i>Ström</i>
Institute	<i>Uppsala University, Uppsala, Sweden. Department of Physics and Astronomy, Ion Physics Group</i>
e-mail	<i>petter.strom@physics.uu.se</i>

Personal: Born 1989, Uppsala, Sweden **Nationality:** Swedish

Present research role and research experience

I'm presently employed as assistant professor in materials physics, working with ion-material interactions, ion irradiation, energy loss mechanisms, material nanostructuring, ion beam analysis, instrument development and teaching on a few courses. I'm also coordinating beamtime and daily work at the ion implanter facility which is part of the Tandem Laboratory national research infrastructure. Furthermore, I have extensive experience of plasma-material interaction studies for nuclear fusion research, as indicated by my listed publications. My previous work includes characterization of materials retrieved from tokamaks, as well as studies of surface modification in low activation steel under deuterium ion irradiation and thermal annealing.

Degrees

2019 Doctor of Philosophy in the subject area of Electrical Engineering

KTH, Royal Institute of Technology, Stockholm, Sweden.

Thesis: "*Material characterization for magnetically confined fusion: Surface analysis and method development*"

2013 Master of Science in Physics

Profile: Applied nuclear physics and fusion science,
Uppsala University and Aix-Marseille University.

Thesis: "*Measurements of electric fields in a plasma by Stark mixing induced Lyman- α radiation*"

2011 Bachelor of Science in Physics, Uppsala University.

Degree thesis: "*Systems for measuring electric fields from lightning*".

Relevant Employments

2021 - present Assistant Professor, Uppsala University, Uppsala, Sweden,

Department of Physics and Astronomy, Applied Nuclear Physics (-2024), Materials Physics (2024-).

2019 - 2021 Postdoctoral Researcher, Uppsala University, Uppsala, Sweden,

Department of Physics and Astronomy, Applied Nuclear Physics – Ion Physics Group.

2013 - 2019 Doctoral candidate, KTH, Royal Institute of Technology, Stockholm, Sweden.

2011 - 2012 Part time employment, Thé Svedberg Laboratoriet, Uppsala.

- *Installation of camera hardware for safety and beamline monitoring.*
- *Virtualization of dosimetry computer system.*

2011 - 2012 Part time employment, Division for High Energy Physics, Uppsala University.

- *Construction and programming of control system components for the European XFEL.*

Scientific Record

Publications: 50, Citations: 1392, h-index: 16, i10-index: 27

- Reviewer for International Journal of Modern Physics E, Nuclear Instruments and Methods in Physics Research B, Nuclear Materials and Energy.
- Evaluator within the mobility programme SASPRO2, Slovak Academy of Sciences (2021)

University teaching experience

[Vector Calculus \(ED1110\)](#), KTH, Royal Institute of Technology, 4.5 ECTS, first cycle

Exercise sessions and problem demonstrations, 4 years participation (2015-2018).
12 sessions per course year. 15-20 students per session.

[Engineering Science \(ED1100\)](#), KTH, Royal Institute of Technology, 7.5 ECTS, first cycle

Lecture on how to write a scientific report, 1 time participation (2018).
Approximately 30 students.

[Technical Thermodynamics \(1FA527\)](#), Uppsala University, 5 ECTS, first cycle

Correction of student MATLAB exercises and tutorial sessions, 2 year participation (2020-2021).
Up to approximately 100 students with ≈80% submission rate. 2 exercises with 2 tutorial sessions for each exercise, shared responsibility with one other teacher.

[Mechanics \(1FA602\)](#), Uppsala University, 15 ECTS, first cycle

Laboratory exercise teacher, 4 year participation (2020-2023).
Up to 30 students per session, 2-3 sessions of 4 hours for each of 8 lab exercises followed by oral presentation and feedback sessions → Between 64 and 128 hours spent in the lab during normal course year, divided over 2-4 teachers. 2020-2021: Modified schedule due to Covid-19. Additional lab time in smaller groups, recording and execution of remote lab exercises via video link.

[Ion-beam based Materials Analysis](#), Uppsala University, 5 ECTS, PhD course

Teacher, shared role, 5 year participation (2020-2024).
Approximately 5-15 students. Responsibility for lectures and analysis seminars on Rutherford backscattering spectrometry (RBS), elastic recoil detection analysis (ERDA) and instrumentation.

[Introduction to Nuclear Physics and Its Applications \(1FA318\)](#), Uppsala University, 5 ECTS, first cycle

Reading and providing feedback on student project reports, 2 year participation (2023-2024).
5-15 students.

[Independent Project in Engineering Physics](#), Uppsala University, 15 ECTS, first cycle

Project mentor for one student group, following up project planning and assessing final report.
1 year participation (2024).

[Scientific Programming in Python \(1FA453\)](#), Uppsala University, 5 ECTS, second cycle

Course responsible teacher, 1 year (2024), approximately 30 students. Centred around practical exercises in a computer lab, with follow-up seminars discussing the students' solutions to provided questions. Finishes with a larger project exercise handed in individually. Overall responsibility for course planning, organization, introductory lecture, lab exercises, seminars, assessments and project feedback.

Supervision

Undergraduate

Flygtidsmätningar för att bestämma energiförlust för MeV-joner vid passage genom tunna fristående filmer av titan och aluminium, BSc project, 2 students (2022).

MeV ion irradiation beamline at the Uppsala tandem accelerator: improvements and applications, Internship, 1 student (2020).

Improved handling of a sample holder goniometer at Uppsala University's Tandem Laboratory, MSc level project course, 1 student (2020).

Efficiency of a Time-of-Flight Detection System for Analysis of Wall Material From Controlled Fusion Devices, BSc project, 2 students (2017).

PhD

Main supervisor: Rajdeep Kaur (2022-ongoing. Lic. 2024-03-01)

Lic. thesis: *Case Studies in Ion Beam Assisted Nanostructure Engineering*

Co-supervisor: R. Holenak (2019-2022, PhD scheduled 2024)

J. Shams-Latifi (2019-2022, PhD 2024-06-14)

PhD thesis: *Interactions of low-energy ions with plasma-facing materials*

L. Schönström (2019-2021, project discontinued)

Pedagogical training

Supervising Doctoral Students, Uppsala University, three weeks (2022)

Academic Teacher Training Course, Uppsala University, five weeks (2022)

Fac. of Science and Technology, Doctoral Supervisor Training, Uppsala University, two days (2019)

Basic Communication and Teaching, KTH, Royal Institute of Technology, two weeks (2014)

Grants and scholarships

2021 Liljewalchs foundation

Travel scholarship for 1st Applied Nuclear Physics Conference, Prague, Czech Republic. Amount: 15 000 SEK

2015 Pleijel Foundation, E-2014-0752

Travel grant for 22nd Int. Conference on Ion Beam Analysis, Opatija, Croatia. Amount: 10 000 SEK

2014 Pleijel Foundation, E-2013-0621

Travel grant for 12th Kudowa Summer School "Towards Fusion Energy", Kudowa Zdrój, Poland. Amount: 8 000 SEK

Awards

2014 Kudowa School "Towards Fusion Energy",

1st place in the contest for the best presentation

2014 KTH Royal Institute of Technology Materials Day,

3rd place in the Elevator Pitch competition

Five selected publications

P. Ström *et al.*, "Position-Selective Introduction of Ferromagnetism on the Micro- and Nanoscale in a Paramagnetic Thin Palladium Film", *Physica Status Solidi, Rapid Research Letters*, vol. 18, 2400053, 2024.

- R. Kaur *et al.*, "Ion Track Formation and Nanopore Etching in Polyimide: Possibilities in the MeV Ion Energy Regime", *Macromolecular Materials and Engineering*, vol. 309, 2300232, 2024.
- P. Ström *et al.*, "Ion beam tools for nondestructive in-situ and in-operando composition analysis and modification of materials at the Tandem Laboratory in Uppsala", *Journal of Instrumentation*, vol. 17, P04011, 2022.
- P. Ström *et al.*, "Energy deposition by nonequilibrium charge states of MeV ^{127}I in Au", *Physical Review A*, vol. 103, 022803, 2021.
- P. Ström *et al.*, "Sputtering of polished EUROFER97 steel: Surface structure modification and enrichment with tungsten and tantalum", *Journal of Nuclear Materials*, vol. 508, pp. 139-146, 2018.