

Physics and related areas in Lund



LUND
UNIVERSITY

Johan Bijmens

Lecture 1 part 2 Introduction to PhD studies

Physics and
related areas
in Lund

Johan Bijmens

Where Physics

Department of
Astronomy
and
Theoretical
Physics

Physics
Department



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- 1 Where Physics
- 2 Department of Astronomy and Theoretical Physics
- 3 Physics Department



Where Physics

- Find all via: <http://physics.lu.se> or <http://fysik.lu.se>
(add /english to get the english version)
- The divisions:
<http://www.fysik.lu.se/english/research/research-divisions/>
- **Department of Astronomy and Theoretical Physics** (Science)
- **Physics department:** both Science (Naturvetenskap) and Engineering (LTH)
- **Medical radiation physics** (Science and Medical faculty)
- 568 employees (includes retired, status January 2015) 208 PhD students, 53 Lecturers, 33 Researchers, 27 Research engineers, 12 FoAss, 90 Professors, 44 Postdocs (approximate numbers)
- **Max lab** (now MAX IV) (separate unit inside LU)
- **ESS** (International organization)

Let's surf their webpages to get a feeling of the research

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- Astronomy, astrophysics: Lund observatory (44 people)
 - <http://www.astro.lu.se>
 - <http://www.astro.lu.se/Research/>
- Computational Biology and Biological Physics (28 people)
 - <http://cbbp.thep.lu.se>
 - <http://cbbp.thep.lu.se/activities/>
- Theoretical High Energy Physics (22 people)
 - <http://particle.thep.lu.se>
 - <http://particle.thep.lu.se/activities/>
- New website will start end of March



- Atomic Physics (57 people) (LTH)
 - Applied Molecular Spectroscopy
 - Attosecond Physics
 - Biophotonics
 - Quantum Information
 - Ultrafast X-Ray Science
 - Ultra-High Intensity Laser Physics
- Combustion Physics (57 people) (LTH)
 - Measurement methods
 - Combustion chemistry
 - Phenomenological studies
 - Applications in combustion devices

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- Mathematical Physics (49 people) (Science & LTH)
 - Applied Mathematical Physics
 - Electron correlations and electronic structure of correlated materials
 - Elementary Particle Physics
 - Mesoscopic Physics
 - Nanostructured Quantum Systems
 - Nonequilibrium Quantum Transport in Nanosystems
 - Nonlinear systems & Chaos
 - Solid State Theory
 - Theoretic Nuclear Structure Physics
- Nuclear Physics (56 people) (Science & LTH)
 - Aerosol physics
 - Applied Nuclear Physics (AMS and nuclear microprobe)
 - Experimental Nuclear Physics (Nuclear structure and photo nuclear reaction)



- Particle Physics (30 people) (Science)
 - GRID Computing
 - ATLAS
 - ALICE
 - LDMX
 - Older: H1 (HERA), DELPHI (LEP), PHENIX (BNL)
 - Detector development



- Solid State Physics (111 people) (LTH)
 - Materials - Materials Science, Crystal Growth and Nanofabrication
MOCVD, thermodynamics of epitaxial growth, arsenides, phosphides, antimonides, gallium nitride, polytypism, composition control, heterostructures, doping, advanced processing, electron-beam and nanoimprint lithography
 - Physics - Quantum Transport and Optical Physics
spintronics, high-resolution spectroscopy, Raman scattering, photoluminescence, cathodoluminescence, nanowires, quantum dots, hybrid superconductor -semiconductor systems, electronic band structure theory and modelling
 - Devices - Nanoelectronics and Optoelectronics
plasmonics, photovoltaics, graphene, transistors, light-emitting diodes, low-temperature electron transport, two-dimensional electron gases, nanowires, quantum dots
 - Life Sciences - Nanobiophysics and Nanosafety
biocompatibility, toxicity, mechano-sensing, micro- and nanofluidics, particle sorting, DNA, molecular motors, proteins



- Synchrotron Radiation research (45 people) (Science)
 - Catalysis and surface oxidation
 - Low-dimensional semiconductors
 - High-pressure X-ray photoelectron spectroscopy
 - Atomic, molecular and cluster spectroscopy
- Medical Radiation Physics (56 people)(Science & Medical)
 - MRI Group
 - Nuclear Medicine Group
 - Radiotherapy Physics
 - The SIMIND Monte Carlo program
 - MedMAX
- Medical Radiation Physics, Malmö (40 People) (Medical)
 - MR
 - Nuclear medicine
 - Environmental Radiology
 - Radiology Breast tomosynthesis
 - Radiology CT
 - External beam radiotherapy



Also linked from the main physics page:

<http://www.fysik.lu.se/english/research/research-centres/>

- CAST - Consortium for Aerosol and Technology
- CECOST - Center for Combustion and Technology
- LUCC - Combustion Center
- LLC - Lund Laser Center
- LLC - Linnaeus Centre
- Linnaeus Centre for Nanoscience and Quantum Engineering
- nmC@LU - Nanometer Structure Consortium



- Synchrotron radiation research
 - use IR to X-ray radiation from electrons
 - Bending magnets
 - Wigglers
 - Undulators
 - Free electron lasers
 - MAX I,II,III \implies IV
 - More intensity, shorter pulses
 - Structure of ... : materials, cells, ...
- <https://www.maxiv.lu.se/>



- Use spallation to produce neutrons
- Same type of research as in MAXLAB: structure of. . .
- <https://europeanspallationsource.se/>

