Sweden's leading university of technology

- Sweden's oldest and largest university of technology.
- More than 12,000 full-time (equivalents) students.
- More than 1,800 PhD students.
- Over 4,800 employees.
- Ranked as the 126th best university in the world by THE.
- Ranked as the 30th best univ. of technology in the world by THE.
President Obama visits KTH
September 4th 2013
KTH’s organisation

University Board

President

University Administration

Faculty Council

Architecture and the Built Environment

Biotechnology

Chemical Science and Engineering

Computer Science and Communication

Education and Communication in Engineering Science

Electrical Engineering

Engineering Sciences

Industrial Engineering and Management

Information and Communication Technology

Technology and Health
KTH research platforms

- Materials
- Life Science
- Energy and Climate
- ICT
- Transport

KTH
Sources of income 2013

Income total MSEK 4,038 = M$484

- Level 1 and level 2 education 23.7% (26%)
- Research and doctoral studies grants 26.4% (25%)
- Research Councils 9.8% (9.6%)
- Other government agencies 16.5% (15.7%)
- Strategic foundations 2.4% (2.3%)
- EU 7% (7.4%)
- Other private sources/companies 14.2% (14%)
KTH - An international university

International KTH faculty and researchers
Worldwide student exchange
International students (degree-seeking)
International collaboration

- CLUSTER
- 4 KICs
- China Centres of Excellence
- INSPIRE Illinois

- Students, staff and alumni from more than 100 countries
- International collaboration initiatives…
Collaboration with society

**Strategic partnerships**
Long-term dialogue on executive level
Short-term goals for education and research

**Mobility**
Adjoint professors, affiliated faculty, industry PhD students
Adjoint experts, affiliated experts
School of Engineering Sciences

Organization:

- Rektor
- Dean
- School Administration
- School advisory board
- Applied physics
- Physics
- Theoretical physics
- Mathematics
- Aeronautical and Vehicle Engineering
- Solid Mechanics
- Mechanics
Department of Theoretical Physics

Biophysics

Condensed matter physics

Particle and mathematical physics

Olle Edholm

Alexander Balatsky

Anders Rosengren

Tommy Ohlsson

Erik Lindahl

Patrik Henelius

Mats Wallin

Edwin Langmann
Department of Theoretical physics

BIOPHYSICS
- Membrane and membrane protein modeling
- Bioinformatics and structure prediction
- In silico drug design
- Molecular simulation (GROMACS, Folding at home)
- Soft condensed matter

CONDENSED MATTER PHYSICS
- New types of superconductivity
- Materials at high T and P. Structure of the earth core
- Copper corrosion and nuclear waste disposal
- Spin models
- Disordered systems, Dirac materials

PARTICLE AND MATHEMATICAL PHYSICS
- Neutrino physics
- Dark matter, extra dimensions
- Exactly solvable models
- 2D correlated Fermion systems
- Quantum field theory; Open quantum systems
### Applied Physics: Bio-Opto-Nano & Teaching

<table>
<thead>
<tr>
<th>Topic</th>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical &amp; X-Ray Physics</td>
<td>28</td>
<td>X-rays (sources, microscopy, imaging), ultrasonics, cell biology, visual optics</td>
</tr>
<tr>
<td>Cell Physics</td>
<td>19</td>
<td>Microscopy, protein interaction, cell biology, modeling, immunology</td>
</tr>
<tr>
<td>Biomolecular Physics</td>
<td>11</td>
<td>Single molecules, fluorescence, microscopy</td>
</tr>
<tr>
<td>Laser Physics</td>
<td>22</td>
<td>Optical materials, non-linear optics, functional light sources</td>
</tr>
<tr>
<td>Nanostruct. Physics</td>
<td>9</td>
<td>Quantum circuits, spintronics, nano-bio surfaces, AFM</td>
</tr>
<tr>
<td>Quantum Electr./Opt.</td>
<td>8</td>
<td>Quantum information, quantum mech.</td>
</tr>
<tr>
<td>Undergr. Teaching</td>
<td></td>
<td>Electromagn. &amp; waves, bio-opto-nano-courses</td>
</tr>
</tbody>
</table>

**Biomedical & X-Ray Physics**
- X-rays (sources, microscopy, imaging)
- Ultrasonics, cell biology, visual optics

**Cell Physics**
- Microscopy, protein interaction, cell biology, modeling, immunology

**Biomolecular Physics**
- Single molecules, fluorescence, microscopy

**Laser Physics**
- Optical materials, non-linear optics, functional light sources

**Nanostruct. Physics**
- Quantum circuits, spintronics, nano-bio surfaces, AFM

**Quantum Electr./Opt.**
- Quantum information, quantum mech.

**Undergr. Teaching**
- Electromagn. & waves, bio-opto-nano-courses
### APHYS Integrated Laboratory Environment

**100 users, 1200 m²**

#### Core facilities (500 m²)

- Nanofabrication
- Laser- and Non-Linear Optics
- Bioimaging
- Molec. & Cell Biology

#### Specialized labs (700 m²)

- Nanofabrication
- Laser- and Non-Linear Optics
- Bioimaging
- Molec. & Cell Biology
Department of Physics

Head of Department: Mark Pearce
**Nuclear physics:** Nuclear structure studies at the limits of existence (experiment and theory). Preparations for FAIR facility. (Prof B. Cederwall, Prof. R. Wyss)

**Particle physics:** ATLAS experiment at LHC. Higgs and supersymmetry. (Prof. B. Lund-Jensen)

**Astroparticle physics:** Cosmic antimatter and (polarised) X-/gamma-rays. Balloon and satellite-borne instruments. (Prof. M. Pearce)

**Physics of medical imaging:** Detector systems for better images and lower radiation doses. (Prof. M. Danielsson)
Reactor technology: Computational (CFD) and experimental reactor thermal-hydraulics and neutronics. (Prof. H. Anglart)

Reactor physics: Generation IV reactors for transmutation of nuclear waste. (Prof. J. Wallenius, Prof. W. Gudowski)

Nuclear Power Safety: reactor/plant safety design and analysis, experimental studies, multiscale modelling. (Prof. S. Bechta)
Nobel Prize in Physics 2013