

#### DTU Ørsted and 200-years of eletromagnetism





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#### Ørsted and 200-years of electromagnetism

- Discovery of electromagnetism
- Why Ørsted



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## Ørsted and 200-years of Electromagnetism

- Reception
- Scientific worldview
- Technology



#### Electromagnetisme

• Lecture 1820



#### How come...

- Expected in romantic Science
- Ørsted inspired by romantic movement



#### **Expectation**

• 1812 in Ansicht Der Chemischen Naturgesetze:

"At the same time, experiments should be conducted to try to determine whether in one of the conditions in which electricity is highly bound, one could produce an effect on the magnet, as a magnet. The matter will not be without its difficulties, because the electricity will act on the magnetic body as on the nonmagnetic one; perhaps it might however be possible to obtain some information about this by comparing magnetic and nonmagnetic needles."

#### Romanticism

- Deep sense and unity in nature
- "Science, art and morals provide insight into the true, the beautiful and the good, and thereby, each in their own way, lead to an understanding of God"
  - The Spirit in Nature



#### Romanticism

- Dynamic world
- Interaction and conflict
- Electricity and magnetism



Caspar David Friedrich : Der Wanderer über dem Nebelmeer 1818

#### Romanticism

- Feelings is way to knowledge
- Untouched
- Individualistic
- Genius
- No experiments?



# **Applied Technology**

- Electricity
- Voltaic pile 1800
- Electrolysis





# Magnetism



## The opposition

- Paris
- Newtonian physics
- Centrally working forces
- Mathematics
- Fluida electricity and magnetism different substances



Newton by Godfrey Knellers 1689

#### Many experiments

- Many systematic tests
- Around the wire
- Overlooked by important people





## In Paris

- German dreaming
- Only currents
- Mathematical theory





## Faraday

- Rotation 1821
- Induction 1831
- Fields





#### Ørsted

- Fantasy and intuition
- Brint, ilt, ildsjæl
- Religion where to find God?





#### Ørsted

- Thorough experimenter
- Trickle down of knowledge
- Mathematics





#### Ørsted

- Political power
- Strengthened science in Denmark
- DTU
- Domineering





#### The first

• 1802 Gian Romagnosi?



#### **Etablished scientists**

H.C. Ørsted:

- 1797 Pharmacist
- 1806 Ekstraordinary professor
- 1817 Ordinary professor
- Experiments can be verified





#### Working at a distance

• Further developing ideas of Faraday and Ampère



#### Maxwell

- Whirling ether
- New form of work by Ampère
- Radiation
- Pure mathematics





# Light

• Light as electromagnetism

#### Fundamental interaction



# Telegraph

- With wire
- In invention flow





#### Cooke and Wheatstone

1891 Stielers Hand-Atlas



# Technologies

• Radio

• Electro motor

#### In conclusion

- Discovery depend on knowlegde community
- Experiments unites Ørsted translate between communities
- Mathematics battle

#### Conclusion

- Interaction of many people and realms
- Everywhere