

# **Interdisciplinarity using the example of history – physics**

**In memory of Lieselott Enders (1927 – 2009)**

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# What does it mean to *live science*

- Freedom, independence
- Dedication
- Honesty, openness, collegiality, generosity,
- humour
- not alienated, social responsibility (H. Ahrendt)

Order  
without  
ranking

Pauli  
Heisenberg

# How science is possible?

- “Everything flows” (Heraclitus)  
→ What are the constant elements in the flow?
- People step into different waters, but into the same river (Heraclitus) → the concepts are relatively constant
- Hegel: The individual dies, but the human species remains (the preservation of the species is the purpose of death)
- Being & Nothingness → Becoming (Hegel)  
Is science the science of the laws of development?

# State – Change of state – Motion

Decartes', Huygens', and Newton's basic laws:

1. Conservation of stationary state
2. Change of stationary state (Huygens: relativity)
3. Equation of motion

Euler's axioms

1. Conservation of stationary state
2. Change of stationary state

The conservation laws (energy!) are more general than the equations of motion!

# Metaphysics and logic *versus* individual science

## The principle of sufficient reason. Symmetry

Nikolaus von Cues (Cusanus):

a) God is everywhere in the universe in the same way

⇒ space is homogeneous and isotropic;

b) no local history is distinguished; God's presence is one and the same at all times

⇒ time is homogeneous and isotropic;

→ Principle of inertia, Minkowski geometry for relative spacetime, Einstein-Planckian instead of Newtonian mechanics...

History, linguistics, ... :

Buridan's donkey, ...?

# Internal *versus* external states/conditions/contradictions

Physics (according to Leonhard Euler):

- inner system parameters, e.g. length of the pendulum of a pendulum clock; they determine which movements are possible at all
- external system parameters, e.g. the strength of the impulse or the initial deflection with which the pendulum is set in motion; they determine which movement actually takes place

Notice:

- Sufis (according to [de.wikipedia.org/wiki/Islam](http://de.wikipedia.org/wiki/Islam)): The inner aspect of Islam (Tariqa) and the outer aspect of Islam (Shari'a) belong inseparably together, like the flame and glass of an oil lamp; without the protective glass, the first breath of wind would blow out the flame – without the flame, the glass is meaningless
- Social sciences: The inner contradictions are generally more important than the outer contradictions

# Thesaurus

## Basic Terms – Classification

1970s: Development of a thesaurus of medical terms for the purpose of transferring files from medical institutions

Overarching significance:

- Basic conceptual framework (as for a good subject index of a book)
- Classification of the sciences and their sub-disciplines

“Archival science is **not** an auxiliary historical science.”

(Lieselott Enders)

*“Language that writes and thinks for you”* (Schiller)

The terms  
are  
the tools  
of our thinking

Imprecise terms  $\Rightarrow$  imprecise thinking

Different terms  $\Rightarrow$  different thinking

“Meudalism”: profound idea or missing the point?

# Laws. I

Forces **act**  
(classical physics)



The laws of physics do not work, they apply  
(in each case under certain conditions)



The laws of human society do not work, they apply  
(in each case under certain conditions)

“The basic laws are simple –  
their application is it by no means!”

# Laws. II

“Wanderer, when you come to Sparta, proclaim there that you have seen us lying here, as the law commanded.”

(cf. Schiller, *The Walk*, 1795)

This kind of law became fundamental to Western civilisation – until the bourgeoisie discovered the **individual** (lat.: the indivisible).

Constitutional law - international law - human rights:

If human rights are not prioritized, science suffers too!

“The study of the original literature  
can be replaced  
only by even more study  
of the original literature”