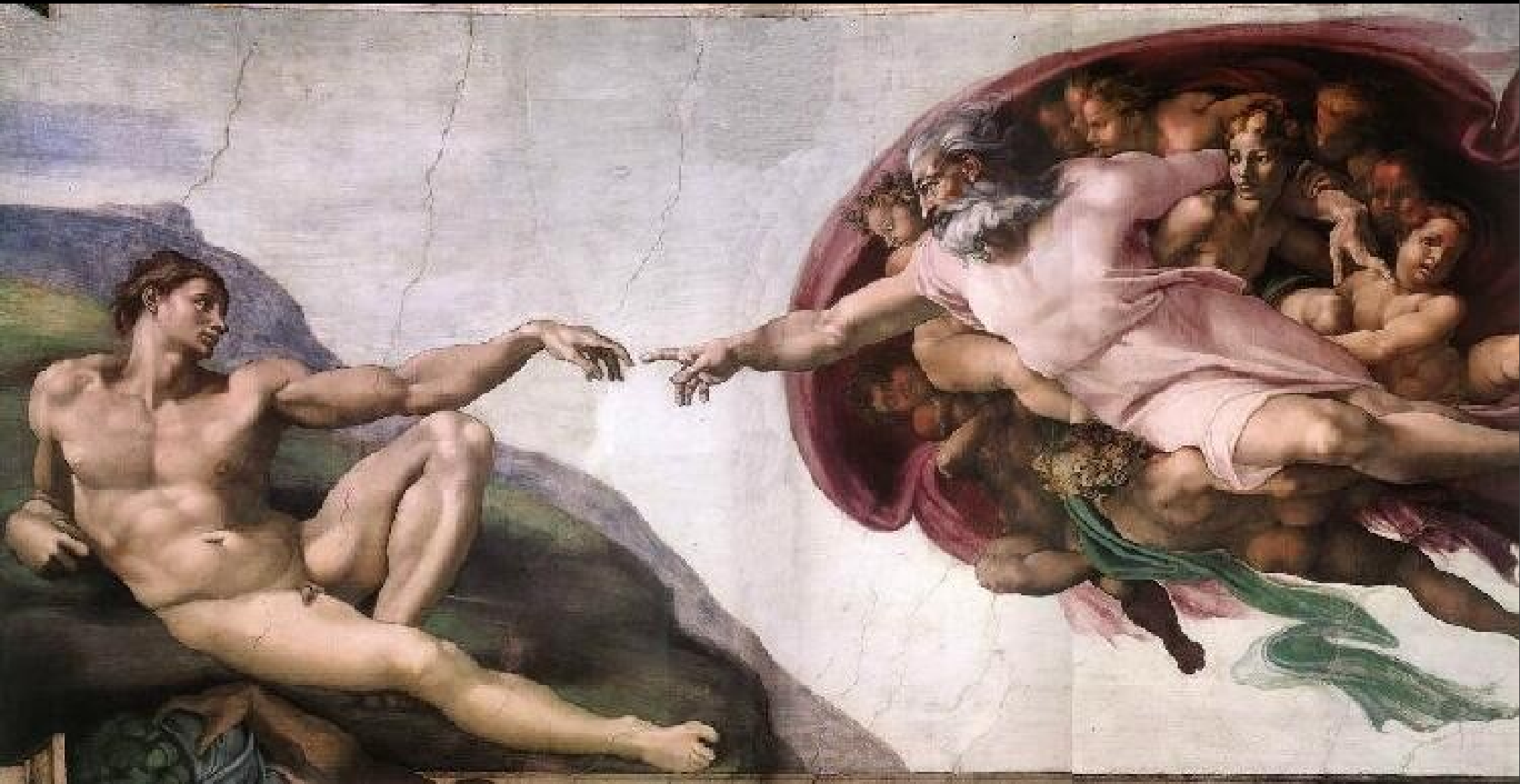


Art & Science

Science & Art



Some thoughts and probably more questions than answers

2012-07-09

Physicists' fundamentals:

What, When, Why, How (exactly)...



Physicists' fundamentals:

What, When, Why, How (exactly)...

How did the universe begin?

What is gravity and are there additional dimensions?

Elementary particles – did we find 'em all?

Supernovae? Black-Holes?

Why do elementary particles have a mass? Why is their mass specific?

Why do Neutrinos have a mass?
Neutrinos = Anti-Neutrinos?

Are protons stable?

How does nature behave on very low
and very large energy scales?

Do magnetic monopoles exist?

Why is the Universe expanding?

Why is there more matter than
anti-matter in the universe?

What is Dark Energy?

What is Dark Matter?

What is the origin of the proton spin?

Are there states of matter
we do not yet know about?

What is the mechanism to explain
high-temperature superconductivity?

Dark Matter, Age of the Universe, ...

... and why there was a “Big Bang”



Dark Matter, the Age of the Universe, and why there was a “Big Bang”



Physics is not about finding 'truths' ...
...but about discovering how nature works.



Science vs. Arts a formal approach

- ... Science demonstrates its effectiveness through tests, equations and proof thus creating new knowledge and certainty.
- ... The arts demonstrates its impact through the senses, transporting people to see the world and relate to each other with a sense of wonder through the power of the imagination.”



Is there really such a big divide?

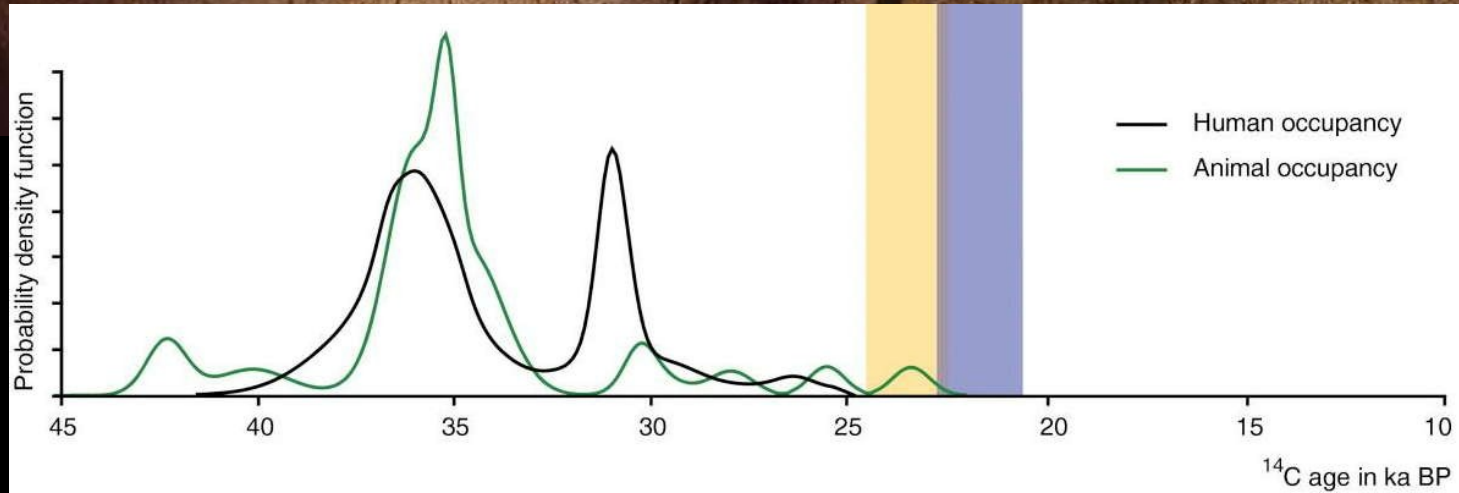
Chauvet-Pont-d'Arc Cave



Art or Science?

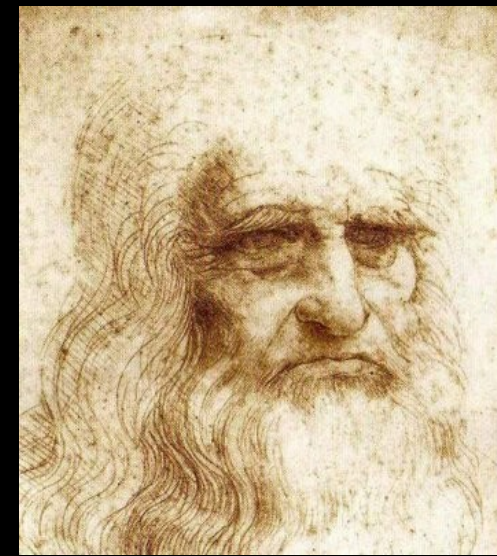
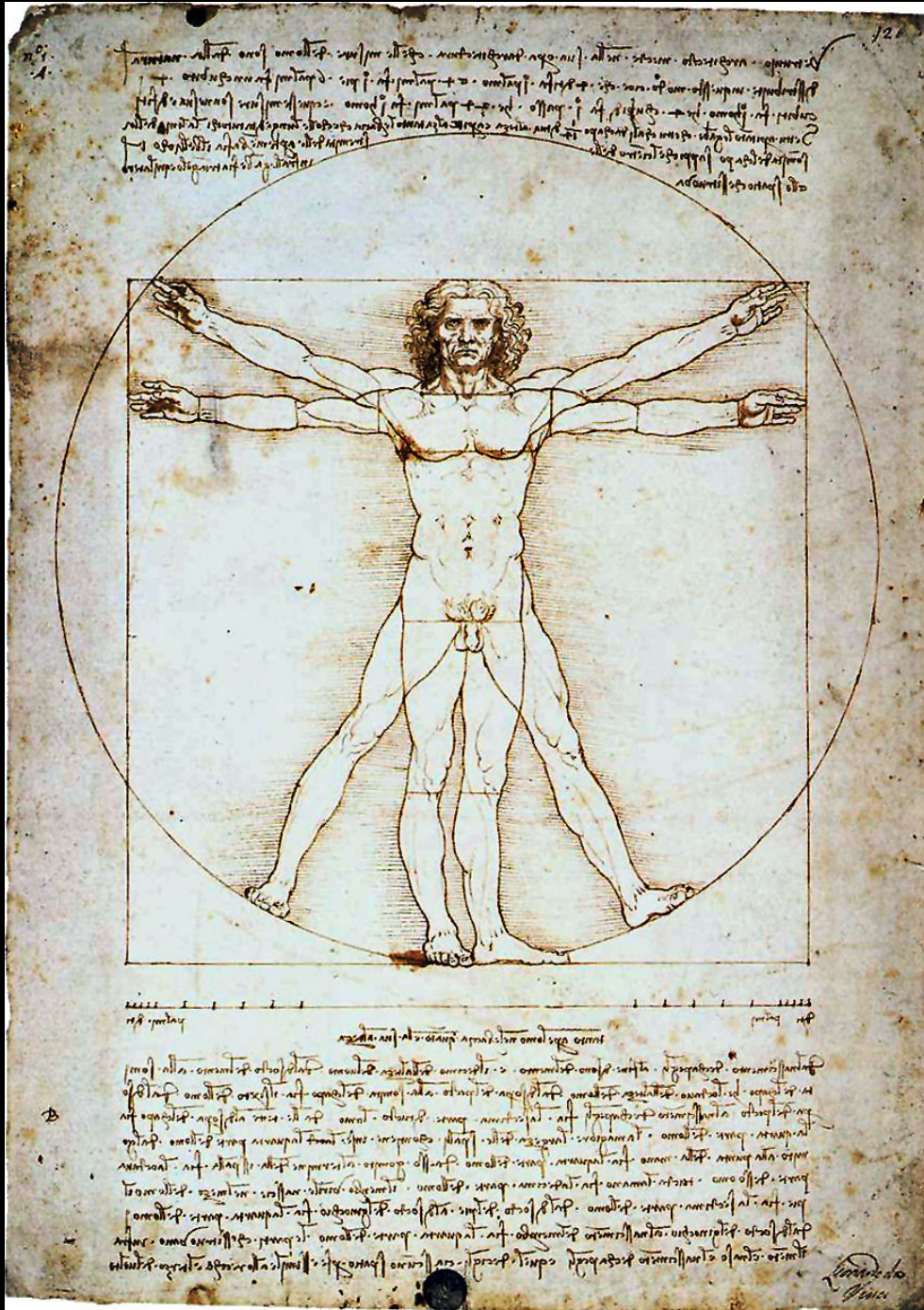
Or just a pre-historic technical hunting manual?

Chauvet-Pont-d'Arc Cave



Some science
~ 30 000 B.C.

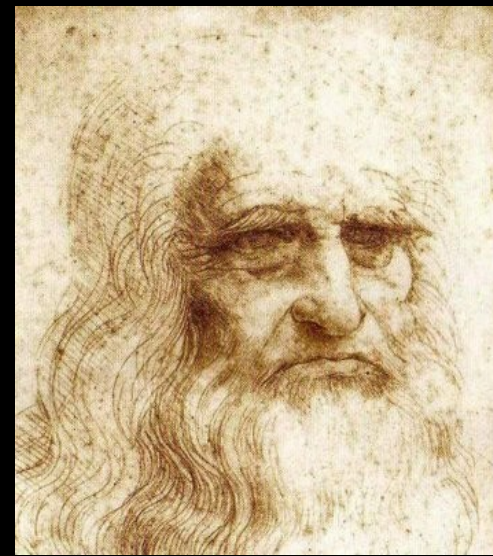
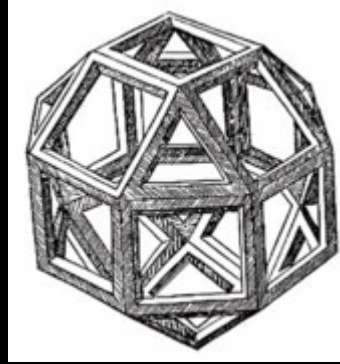
Leonardo Da Vinci I/II



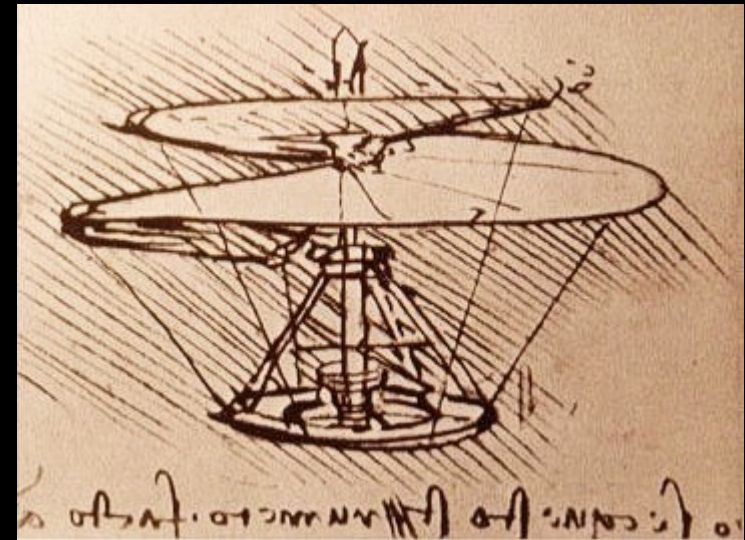
1452 - 1519

Art or Science?

Leonardo Da Vinci



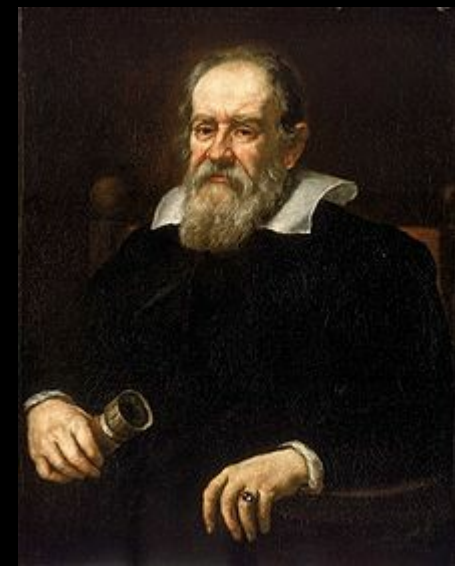
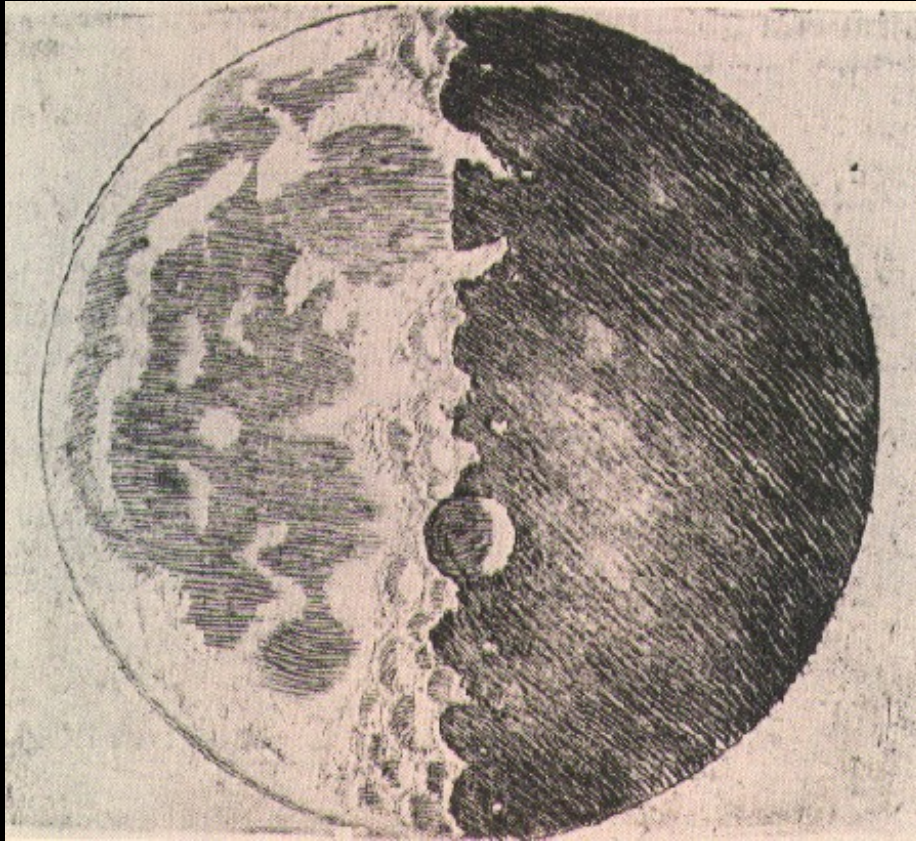
1452 - 1519



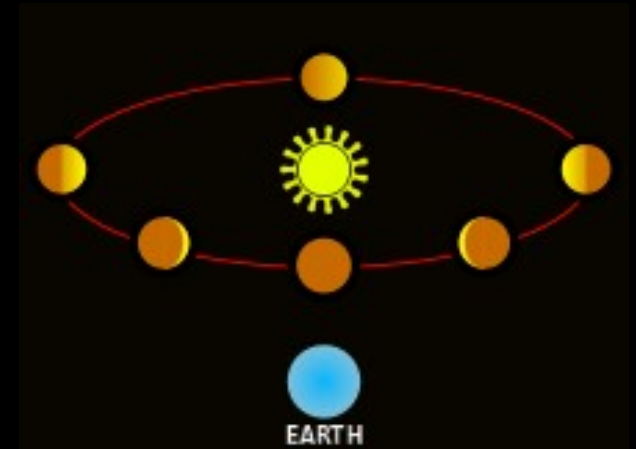
Art or Science?

Galileo Galilei

Accademia delle Arti del Disegno in Florence

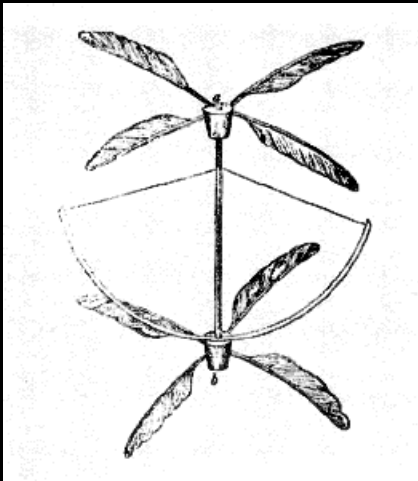


1452 - 1519

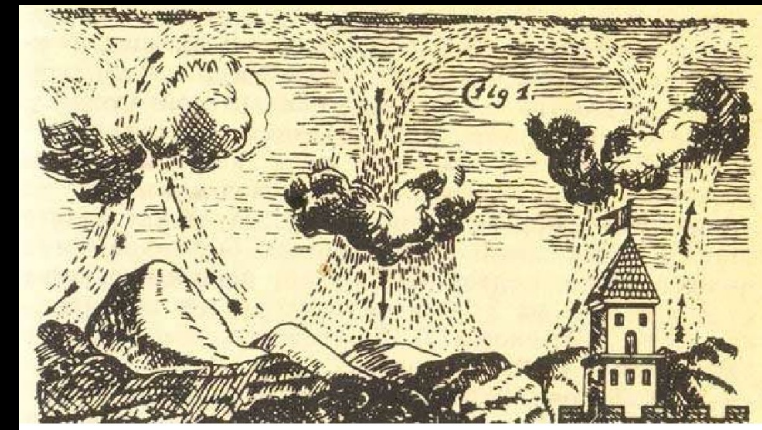
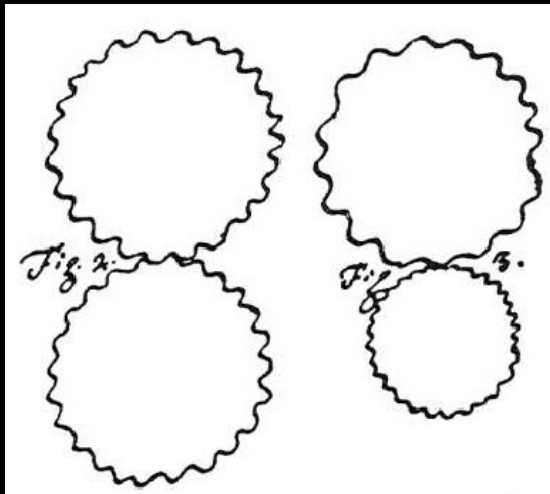


Art or Science?

Mikhail Lomonosov



1711-1765

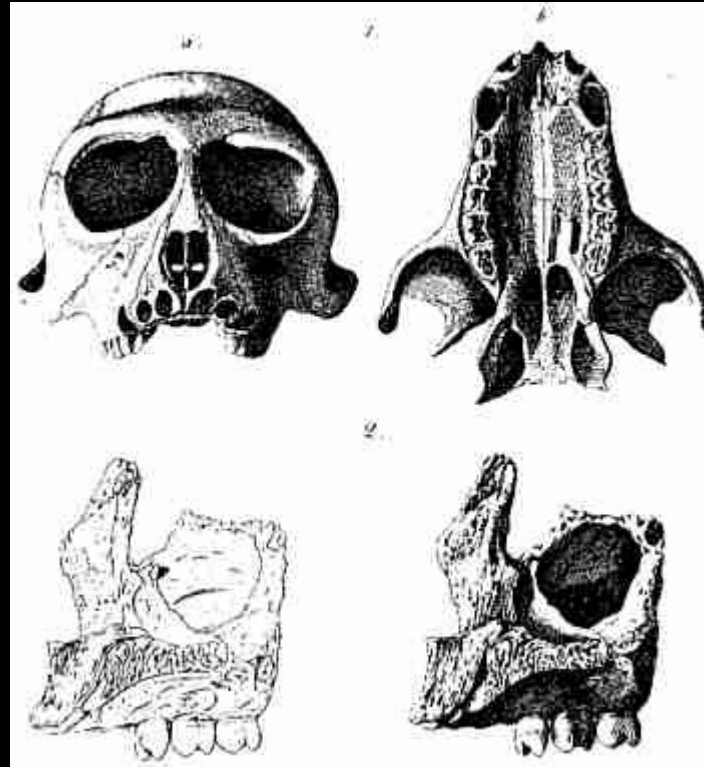
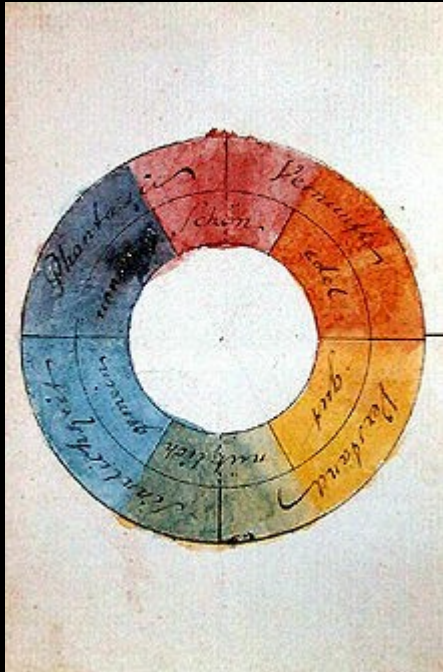


Art or Science?

Johann Wolfgang von Goethe



1749 - 1832

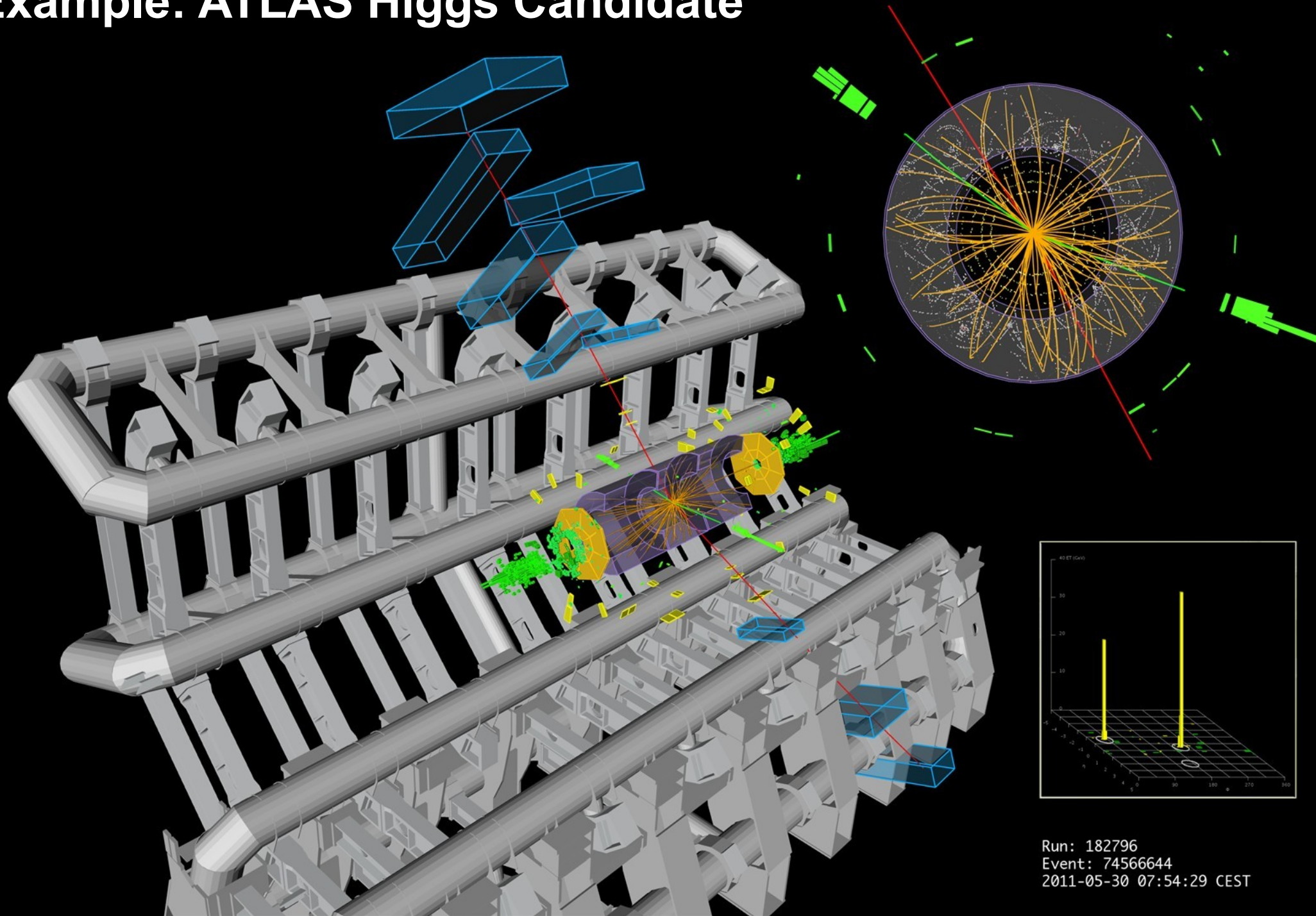


... "The man in himself, inasmuch as he uses his healthy senses, is the largest and most accurate physical apparatus, which can give it, and that's the biggest disaster of modern physics, that the experiments as it has separated from the people and just in what artificial instruments show, know nature, indeed, what they can afford, and want to prove this limit."

Art or Science?

Representation, Interpretation and Judgement in Physics

Example: ATLAS Higgs Candidate



Representation, Interpretation and Judgement in Physics

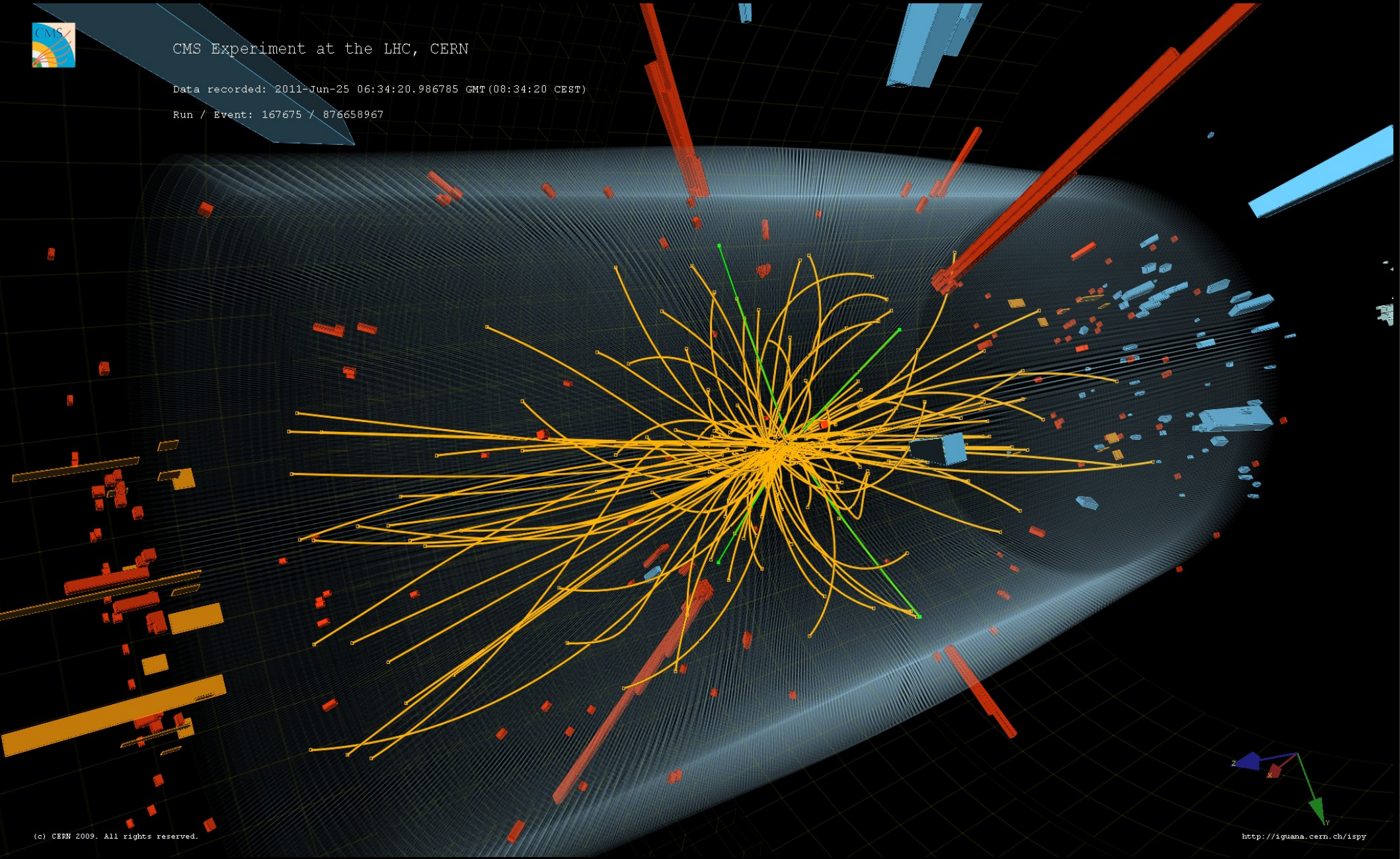
Example: CMS Higgs Candidate



CMS Experiment at the LHC, CERN

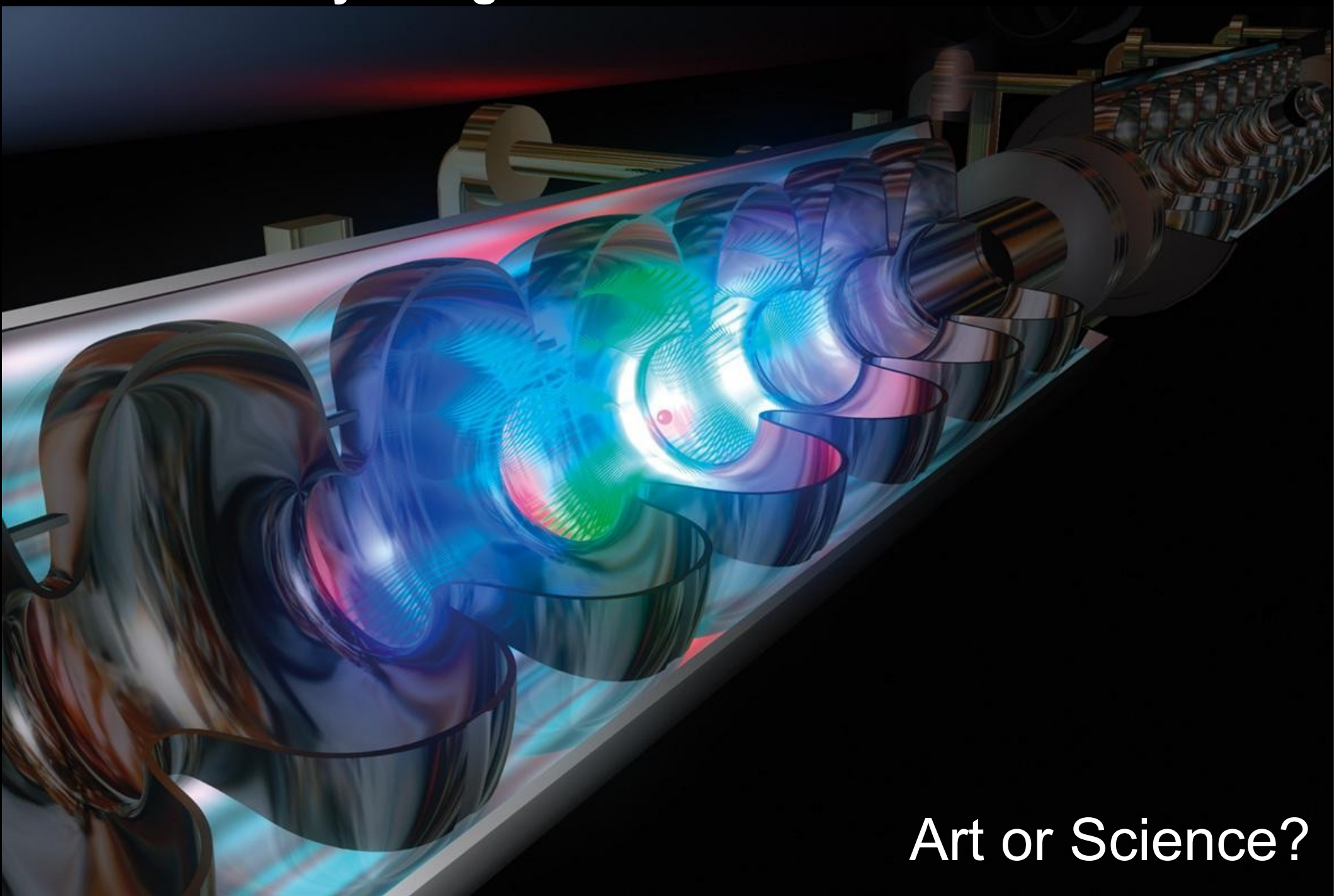
Data recorded: 2011-Jun-25 06:34:20.986785 GMT(08:34:20 CEST)

Run / Event: 167675 / 876658967



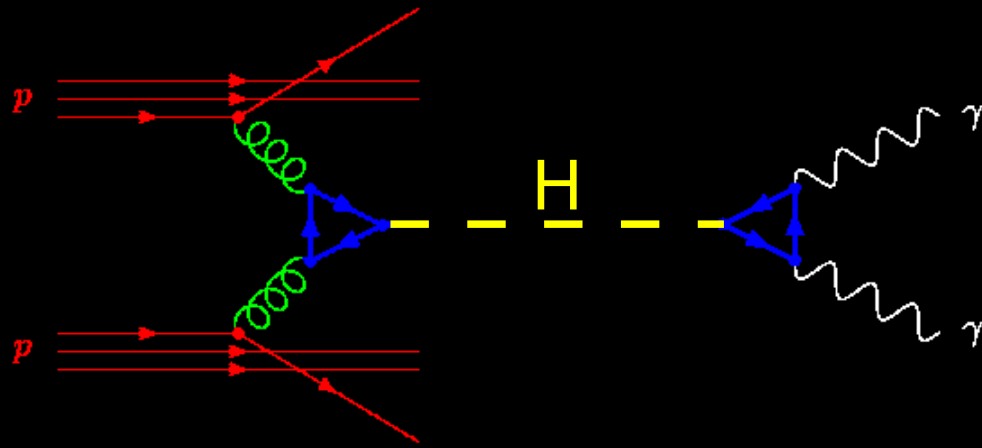
Representation, Interpretation and Judgement in Physics

Tesla RF Cavity Design

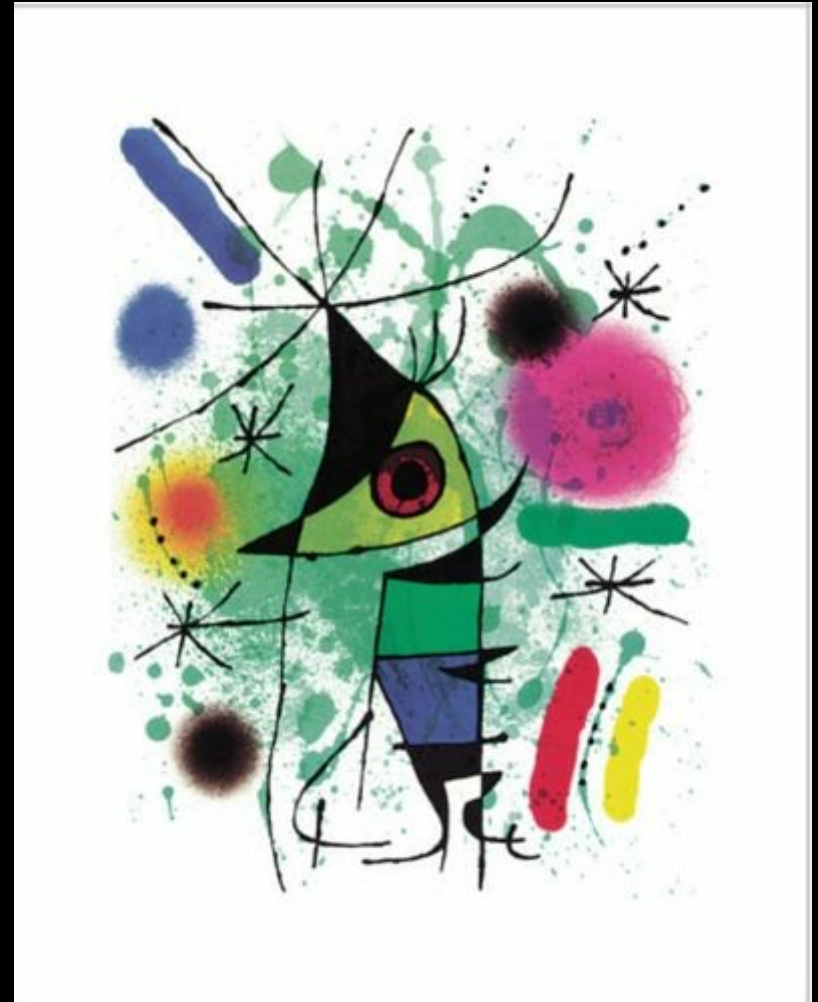


Art or Science?

Higgs Feynmann Diagram



Miro's Singing Fish



Placed on the wall of a Cave, in $3 \cdot 10^4$ years ...?

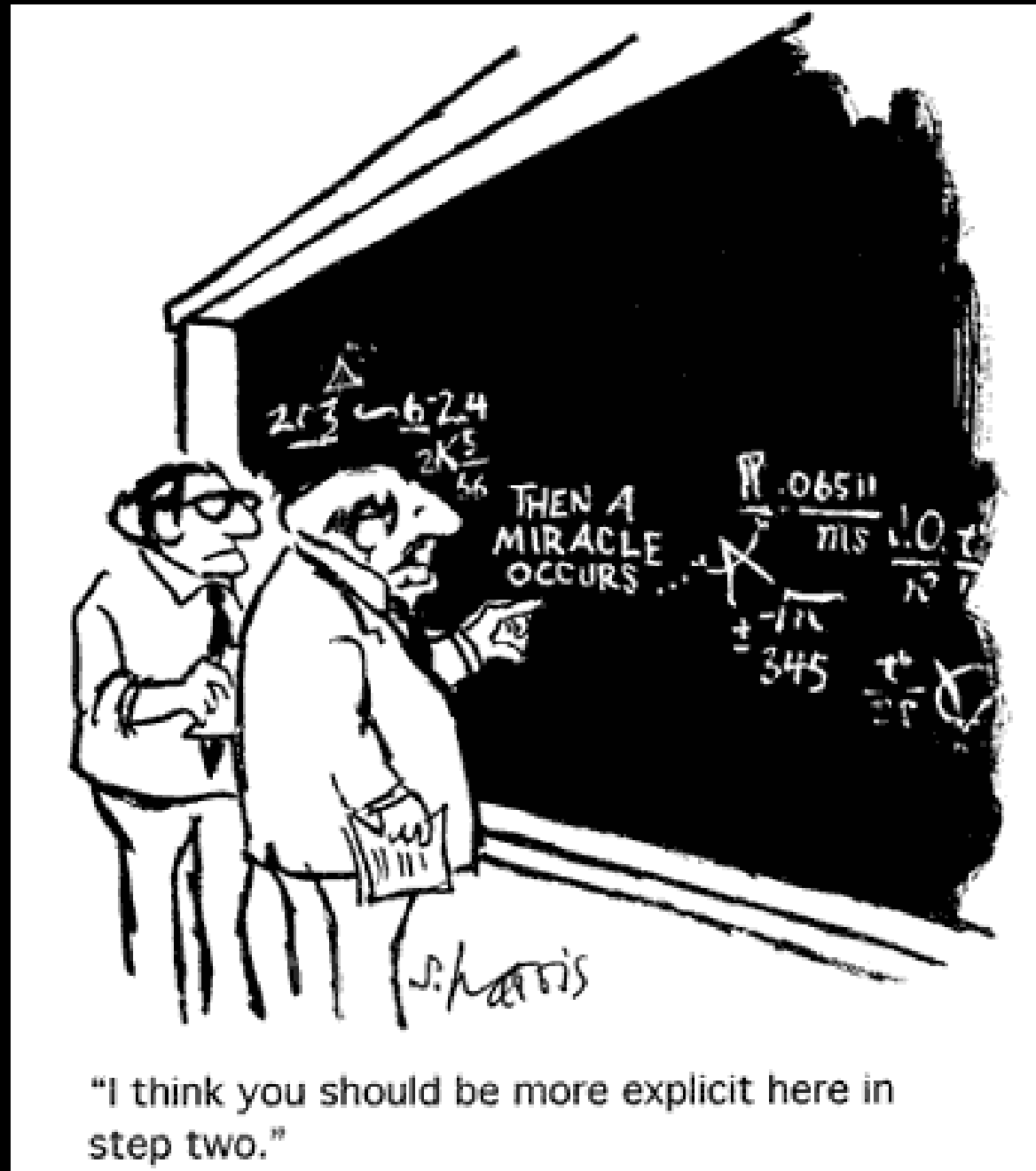
Science or Art?

Art or Science?



"I GUESS THERE'LL ALWAYS BE A GAP
BETWEEN SCIENCE AND TECHNOLOGY."

The Problem with Terminology or why some have trouble with Physics



What are long-, medium- and short-term benefits? ... why we must spend money for science?

Long-Term - World is becoming a Knowledge-based Society/Economy

- Research: Seeking and finding answers to questions about the Universe
- Technology: Advancing the frontiers of technology
- Collaborating: Bringing nations together through science
- Education: Training the scientists of tomorrow

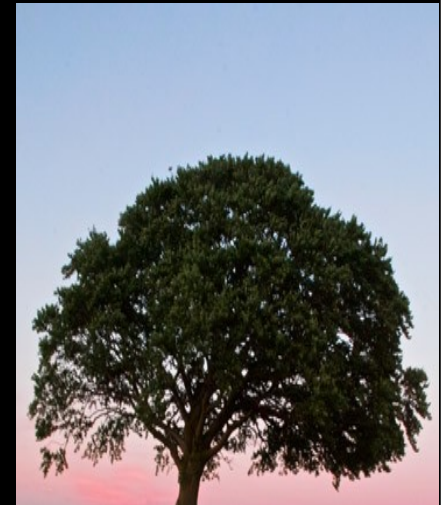


Medium-Term: Fundamental Research enables applied Science, e.g.

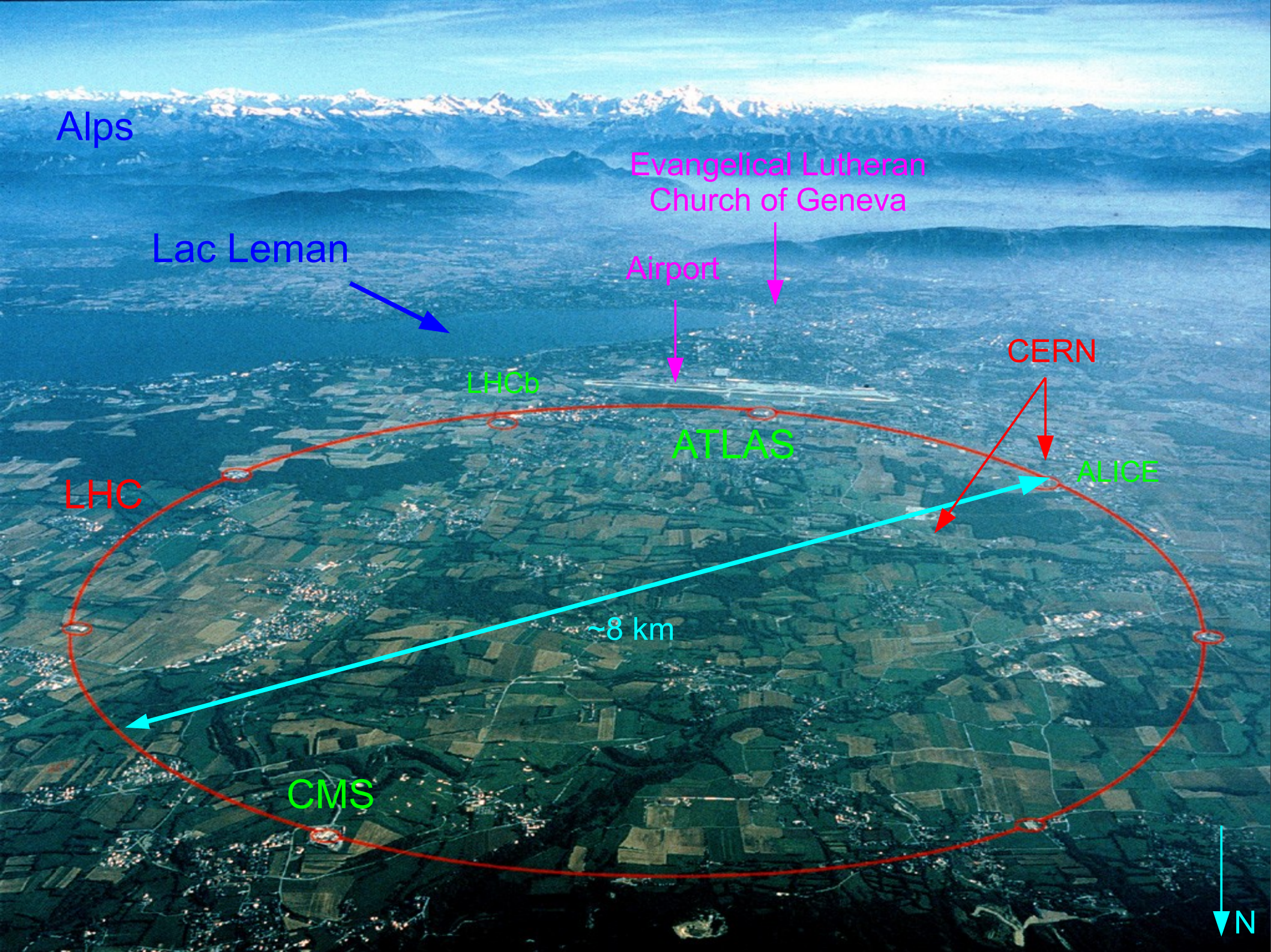
- Quantum-Mechanics → Semi-Conductor → Transistors → Computer
- General Theory of Relativity (Einstein) → Satellites → Global Position System

Short-Term: Advancements in industry....

- Accelerator, Magnet, Cryogenics, Detectors & Instrumentation, Electronics, ...
→ Biology and Medicine: NMR & PET scanners, Ion therapy/cancer treatment
- Information Technology: WWW, GRID, Genome Analysis, ...



What we do today will probably impact and be in your life in 10-20 years...



Alps

Lac Lemman

Evangelical Lutheran
Church of Geneva

Airport

LHCb

CERN

LHC

ATLAS

ALICE

~8 km

CMS

