

# An Elementary Theory of Everything

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Among my interests:

- Physics (professional)
- Philosophy
- Theology
- Buddhism
- Transcendental Meditation
- Veda Chanting

An amateur of knowledge  
(please bear with me)

Collaboration:  
L. Guzzardi, S. Olivares



- Physics as a fundamental knowledge: the quantum field concept
- Philosophy as the most general knowledge: the Western approach
- Philosophy in the Oriental approach: a synthesis

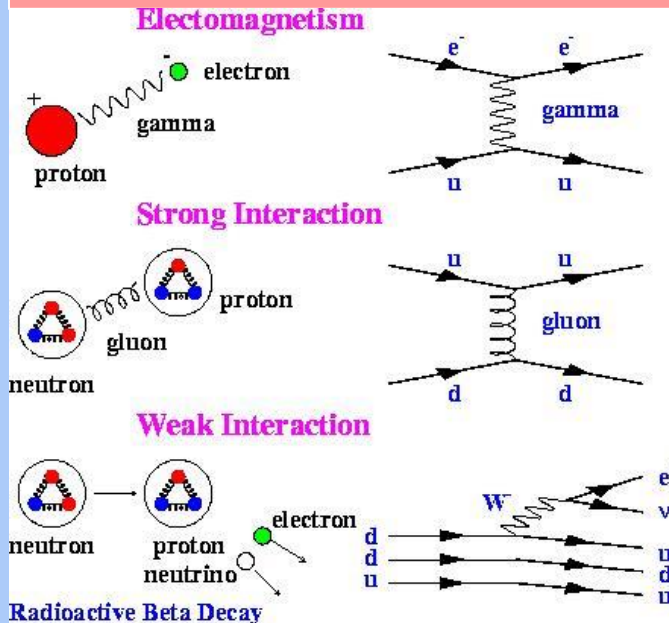
# Physics

- **Physics as a fundamental knowledge: the quantum field concept**
- Philosophy as the most general knowledge: the Western approach
- Philosophy in the Oriental approach: a synthesis

Why physics is a fundamental knowledge?

Because it deals with exploring our categories of thinking, the ones that we use to organize the sensible experience: space and time

## Quantum fields (micro-world)



## The Universe and its spacetime (macro-world)



Deep space  
Age of the Universe

$$l \geq 4300 \text{ Mpc}$$

$$t = 13.8 \times 10^9 \text{ y}$$

$$l = 10^{-18} \text{ m}$$

$$t = 10^{-23} \text{ s}$$

Small space  
Small time

## Key epistemological concepts in Modern Physics

**Classical Newtonian Realistic World:** an Aristotelian theory of becoming (as opposed to metaphysics).

A unique spacetime, universal lengths and times equal for everybody.

**World of Special and General Relativity:** no absolute concept of space and time

Our categories of space and time depend on:

- Motion of observers (Special Relativity, time dilation and length contraction)
- Mass-Energy and acceleration (General Relativity, gravitation as spacetime geometry)

It is still a realistic world – in the sense that any observers would make statements that are independent from him/her observing the system.

**World of Quantum Mechanics:** quantum fields (filling all of spacetime as most fundamental entities).

The world as representation

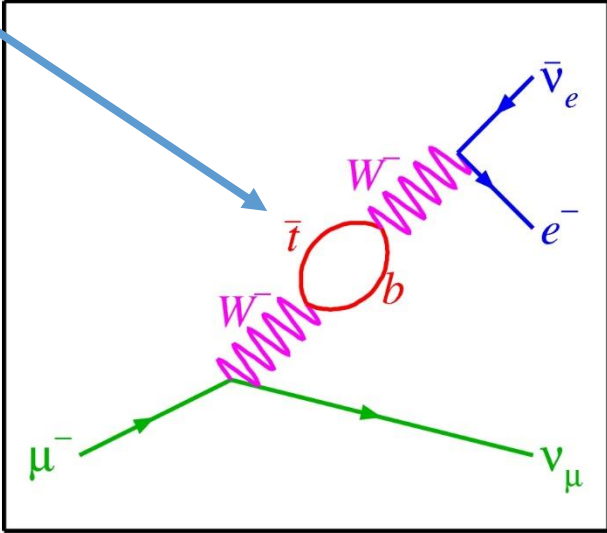
The existence of physical quantities depend – at the Quantum level – on the observer.  
Non-separation between Observer and Reality. The Observer «creates» the physics reality.

M.G. Giammarchi – *Elementary philosophical and theological consequences of quantum mechanics*  
European Journal of Science and Theology vol. 11 (2015) pag. 47

# Much ado about nothing. The Quantum Vacuum

The vacuum at work

A Feynman Diagram



**Parmenides Vacuum:** nothing.

**Classical Vacuum:** objective spacetime, like a theater stage with a clock (one clock for everybody)

**General Relativity Vacuum:** a spacetime for every observer, depending on the motion and the presence of gravitational fields and accelerations

**Quantum Mechanics Vacuum:** a Special Relativity vacuum (depending on the inertial motions) filled with virtual particles. The fluctuations of the Quantum Fields. These fluctuations are NOT independent from the Observer!

We don't have a Quantum Theory of Gravity ☹️

Reality by itself does not exist

- Vacuum effects experimentally confirmed:
- Renormalization Group Equation
  - Casimir Effect
  - Lamb Shift



# The Cosmology (History of the Universe) Slide

## Thermal History of the Universe and the CMB

### 1. inflation (1/2)

Brief period of exponential expansion  
(factor  $10^{26}$  in  $\sim 10^{-34}$  s)

1) Resolve flatness, horizon, relic ...  
problems

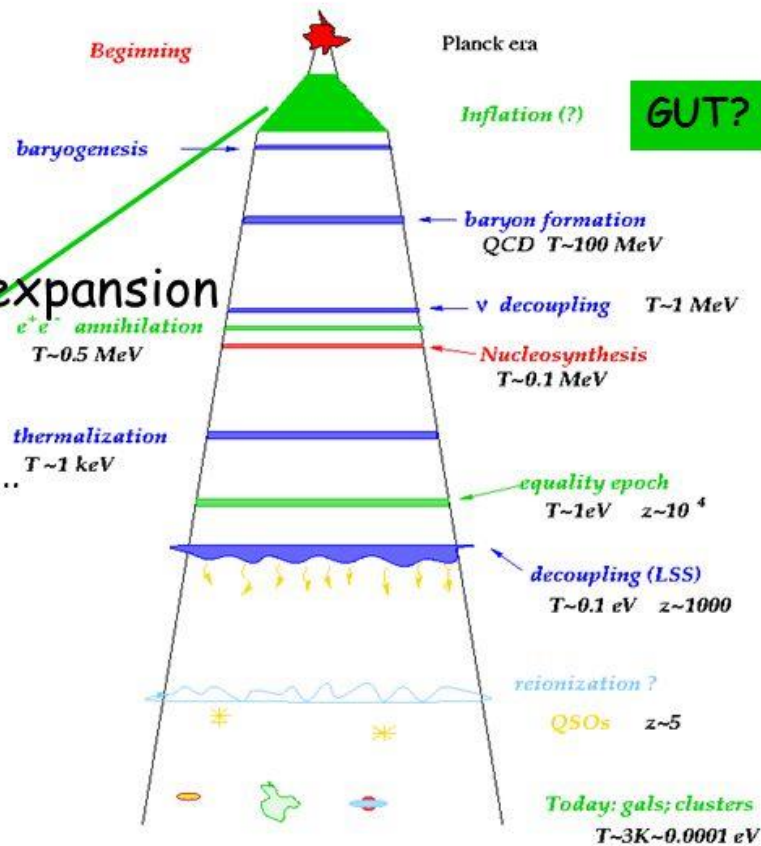
2) Perturbation generation

- density (scalar)

$$\delta_m \sim E_l^6 / V' \sim 10^{-5}$$

- gravitational (tensor)

$$\delta_{og} \sim (E_l / M_{\text{Planck}})^4$$



LHC conference - Isfahan

# Western Philosophy

- Physics as a fundamental knowledge: the quantum field concept
- **Philosophy as the most general knowledge: the Western approach**
- Philosophy in the Oriental approach: a synthesis

Greek Philosophy (quite obviously) : non-mythological look at reality as a whole

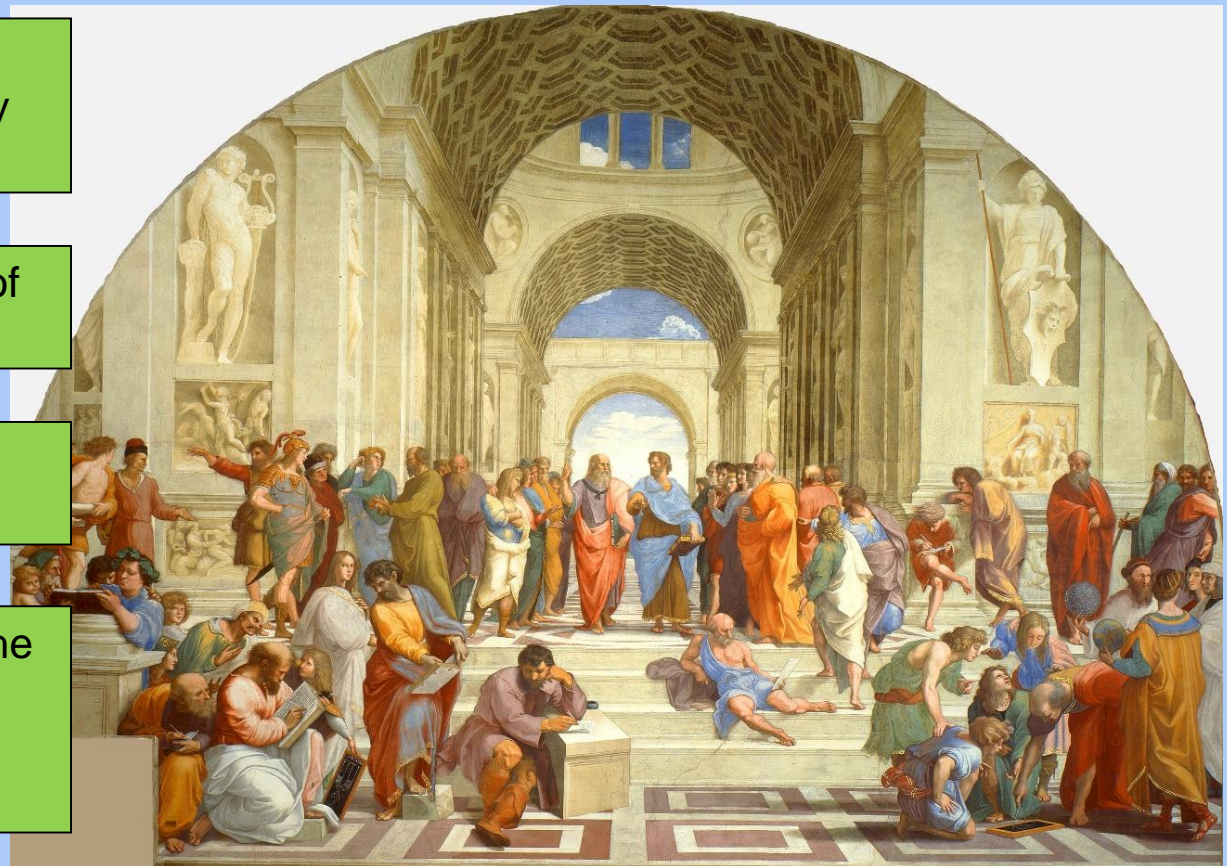
Key concept (E. Severino): the greek sense of becoming (in and out of nothing)

Philosophy as the Remedy  
against the anguish caused by  
the greek sense of becoming

The phase of the construction of  
Classical Metaphysics

The Scholastic philosophical  
and theological synthesis

The philosophical critique to the  
Metaphysics, the concept of  
Cartesian doubting: the non-  
identity of truth and certainty



## Episthemic approach

The search for necessary and incontrovertible truth (episthemic search) has characterized most of Western Philosophy development.



Déscartes' work can be considered as the first critique to the episthemic approach

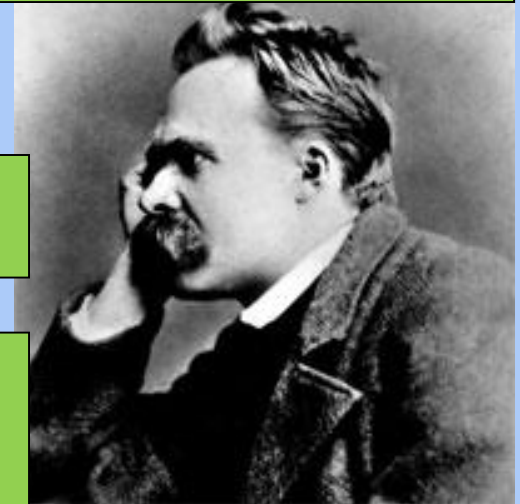
The birth of considering the problem of relation of our thinking to «reality» (whatever it means)

Reconstruction of an episthemic knowledge culminated in German idealism

Hegel form of Idealism: last universal episthemic synthesis

Famous Nietzsche criticism: the remedy is worst than the evil.  
Note: he died in 1900, the year of birth of Quantum Mechanics.

This criticism is inherently philosophical and can be turned into a revolution (E. Severino) in the sense of shaking the foundation: reconsidering the beginnin, the greek sense of becoming.





# Oriental Philosophy

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Vedic Philosophy (quite obviously)

Key concept: The Unity

Eastern Philosophy intrinsically mythological

One-level reality (as opposed to two levels as in the case of Aristotelic philosophy)

Everything is sacred in the world, but the structure of reality is not trivial (perceived through the veil of maya)

The mythological (katenotheistic) spirit is not very relevant from the epistemological viewpoint





Source of many concepts in  
Oriental Philosophy: Vedas

Early Vedic and Classical Period:

Layers of sacred literature:

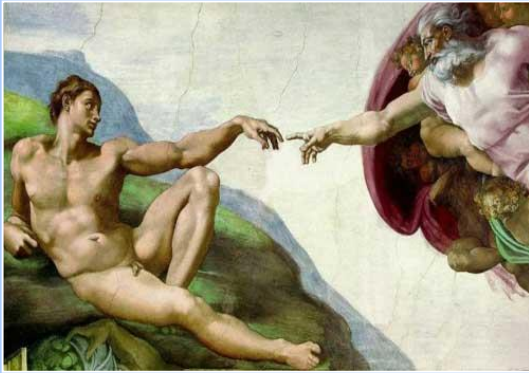
- Samitha (the four Vedas)  
Sacrificial praise and hymns
- Brahmana  
Commentaries of the Vedas
- Aranyaka  
sacrificial hymns and commentaries
- Upanishad  
Philosophical texts



Key concept: Yajna, the Vedic Sacrifice to generate harmony (internal and universal)

Vedic Sacrifice: repair from a fracture.  
The real fracture is the Multiplicity as coming from Oneness

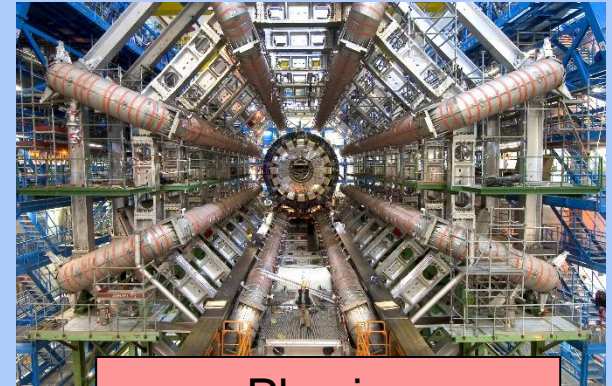
# Conclusion (or beginning)



Western Philosophy



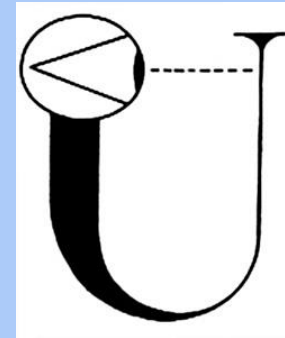
Oriental Philosophy



Physics

The story of philosophy  
The criticism to the Greek  
concept of becoming

Om as the first syllabus of  
the Rigveda. The «sound of  
everything»

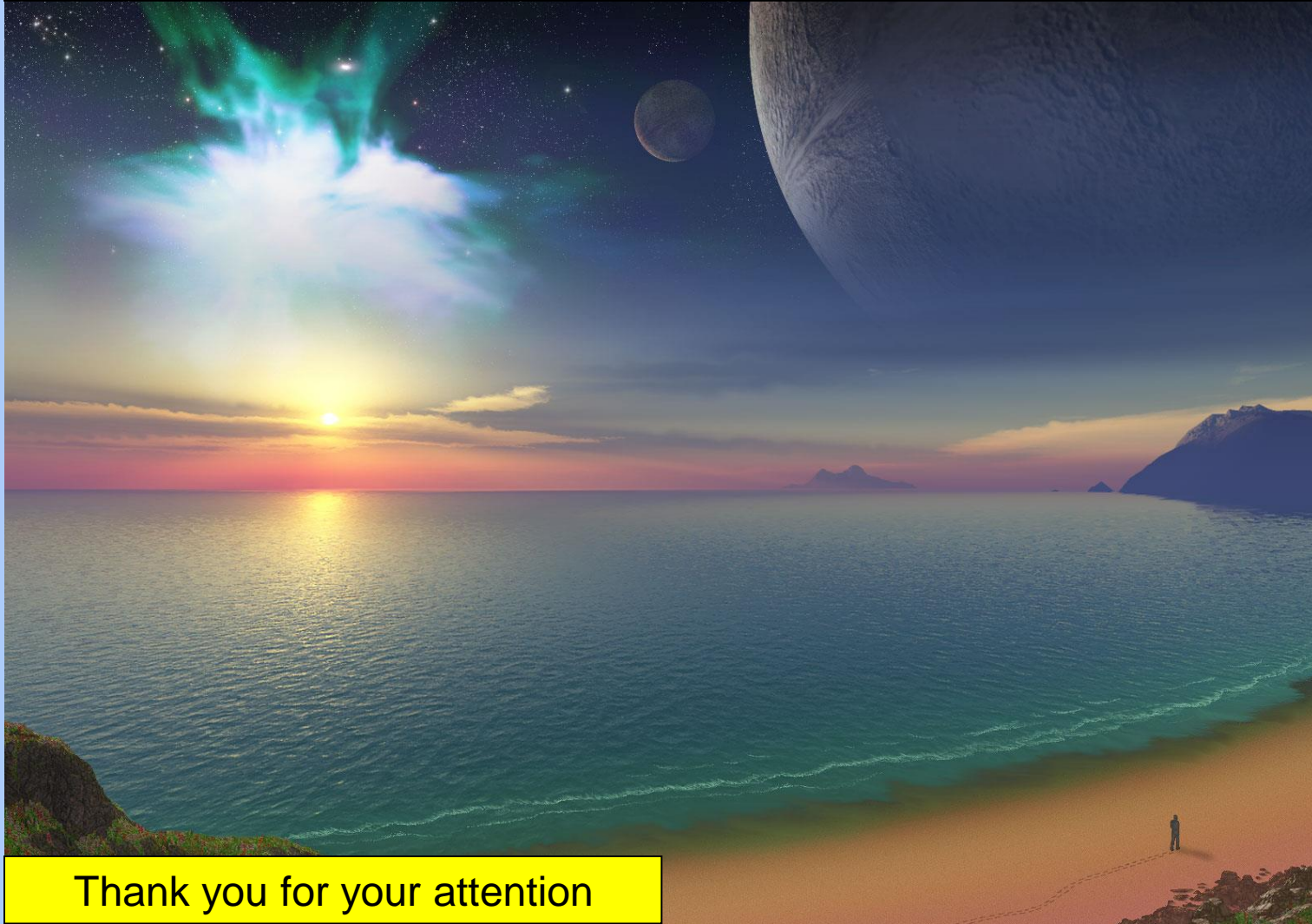


Wheeler «U»  
concept, the  
Quantum  
Universe

Unity, Oneness

*My excellent friend, you are an Athenian, a citizen of this great city, so famous for wisdom and strength, and you take every care to be as well off as possible in money, reputation and place - then are you not ashamed not to take every care and thought for understanding, for truth, and for the soul, so that it may be perfect?*

Plato, Apology (The Defense of Socrates)



Thank you for your attention



# The Quantum Slide

Quantum Mechanics : best theory ever in terms of numerical predictions

Copenhagen Interpretation : (among other things) no sharp separation between observer and quantum system

Entanglement at long distance

Entanglement and classical size

Alternative approach (Bohmian): non local. Still viable.

Classical-Quantum boundary: decoherence as the candidate theory

How can a theory that can account with precision for almost everything we can measure still be deemed lacking?

The only “failure” of quantum theory is its inability to provide a natural framework that can accomodate our prejudices about the workings of the universe (W.H. Zurek). Or the workings of “us and the universe”.