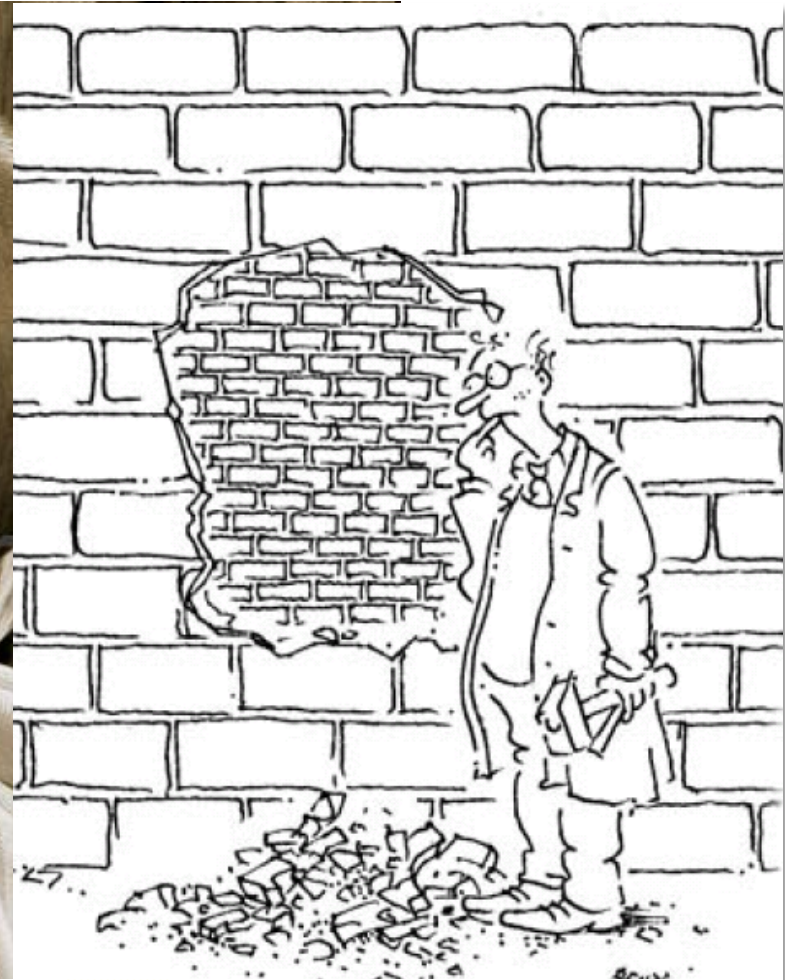
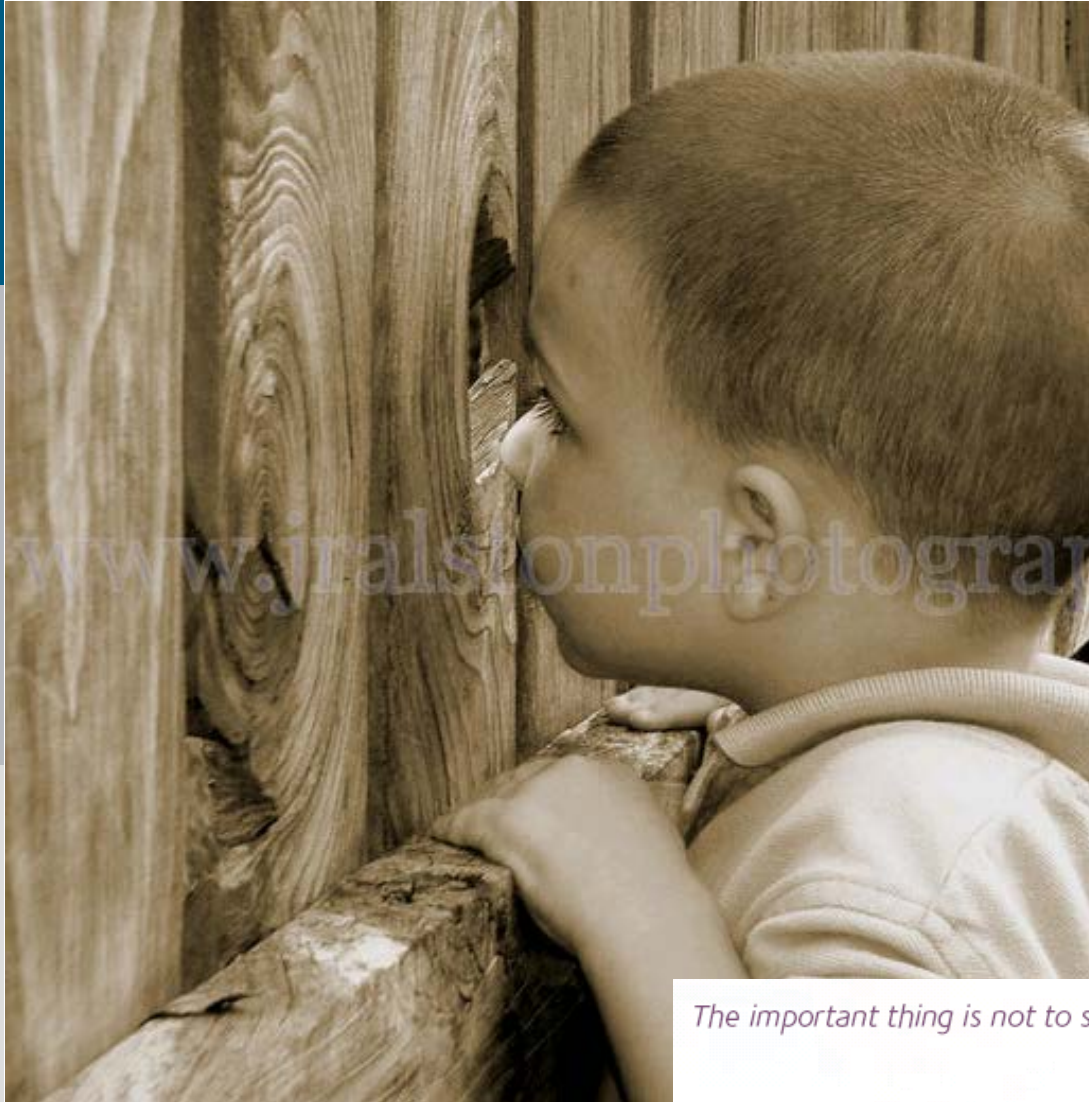




2nd Autumn Lectures – Tbilisi 2015

Introduction

October 2015 | Hans Ströher (Forschungszentrum Jülich)



The important thing is not to stop questioning. Curiosity has its own reason for existing.

Albert Einstein

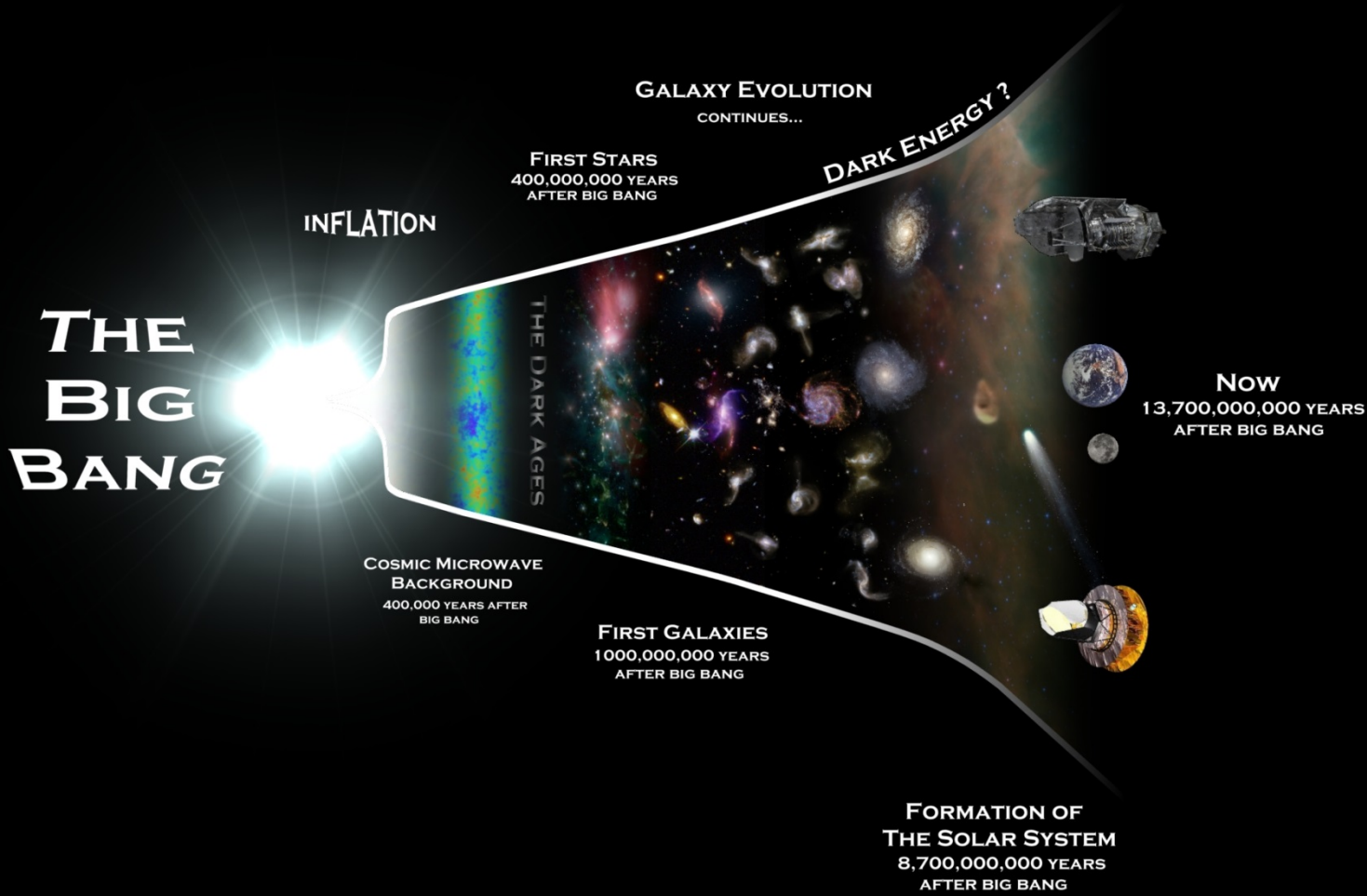
New
Research

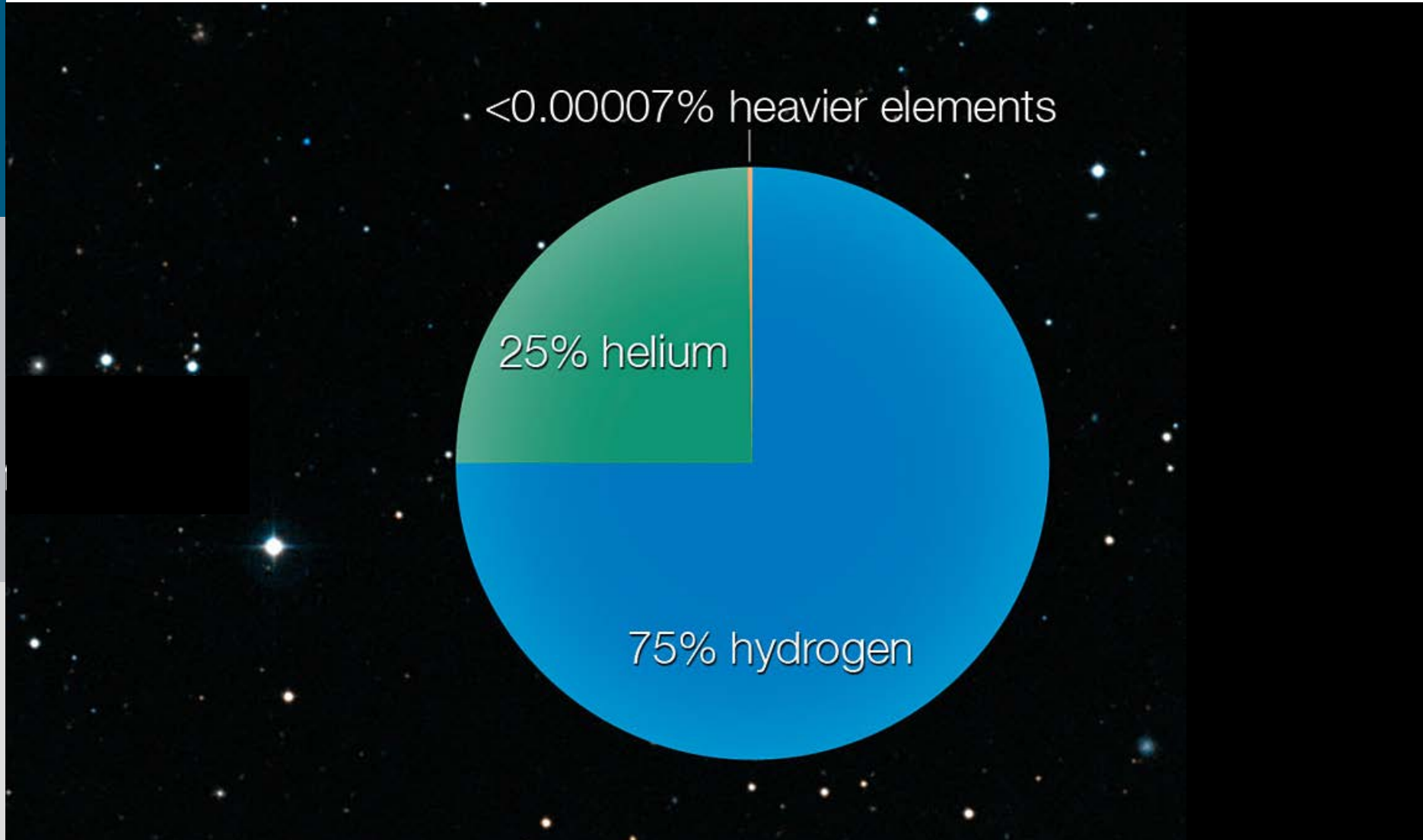
**OUR
KNOWLEDGE**

→ Precision

U N K







We know: Evolution of the Universe














Particles

Leptons

	Electric Charge		Electric Charge
Tau	 -1	Tau Neutrino	 0
Muon	 -1	Muon Neutrino	 0
Electron	 -1	Electron Neutrino	 0

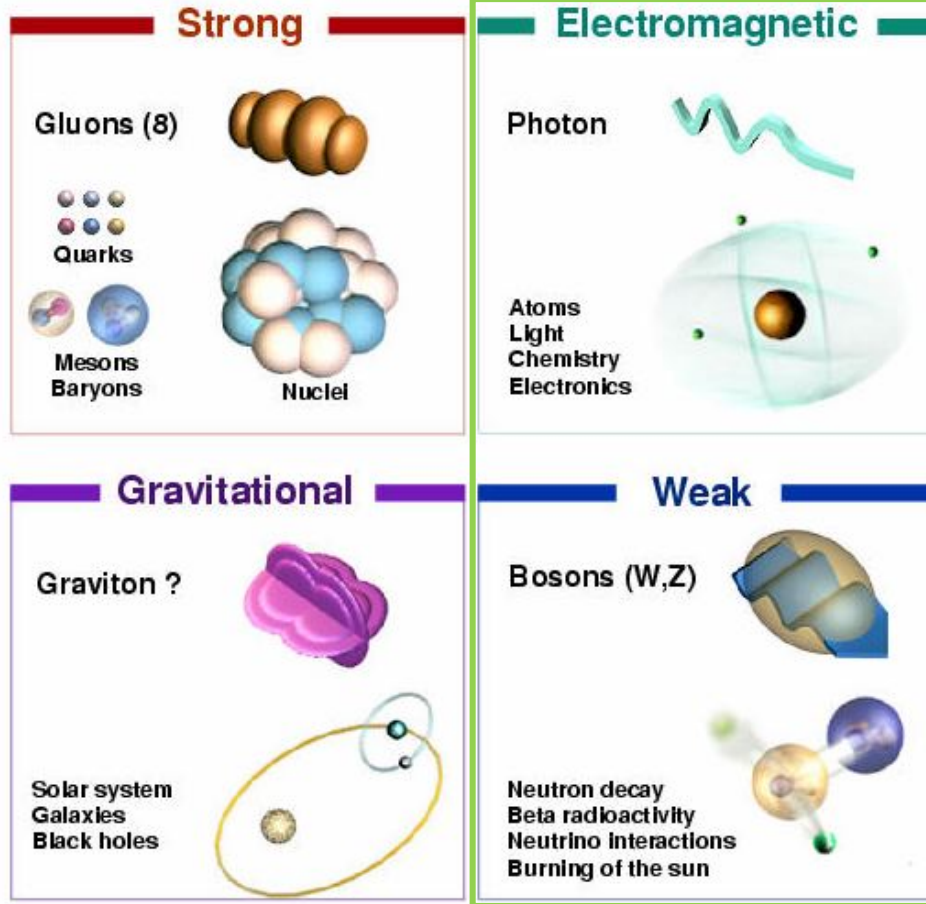
Quarks

	Electric Charge		Electric Charge
Bottom	 -1/3	Top	 2/3
Strange	 -1/3	Charm	 2/3
Down	 -1/3	Up	 2/3

each quark:  R,  B,  G 3 colors

The particle drawings are simple artistic representations

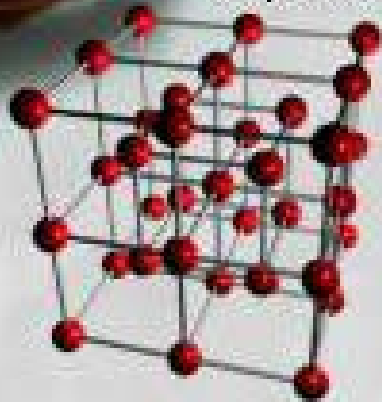
Forces



The particle drawings are simple artistic representations

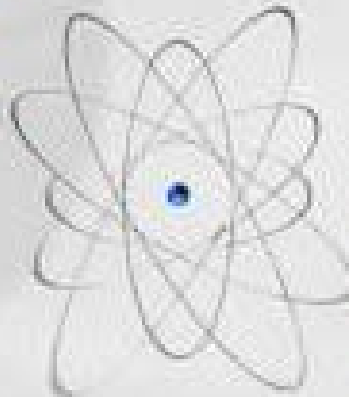
Matter

Crystal



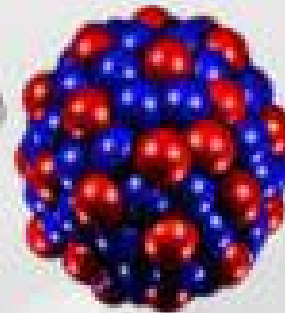
10^{-3} m
(macroscopic)

Atom



10^{-10} m

Nucleus



10^{-14} m

Nucleon

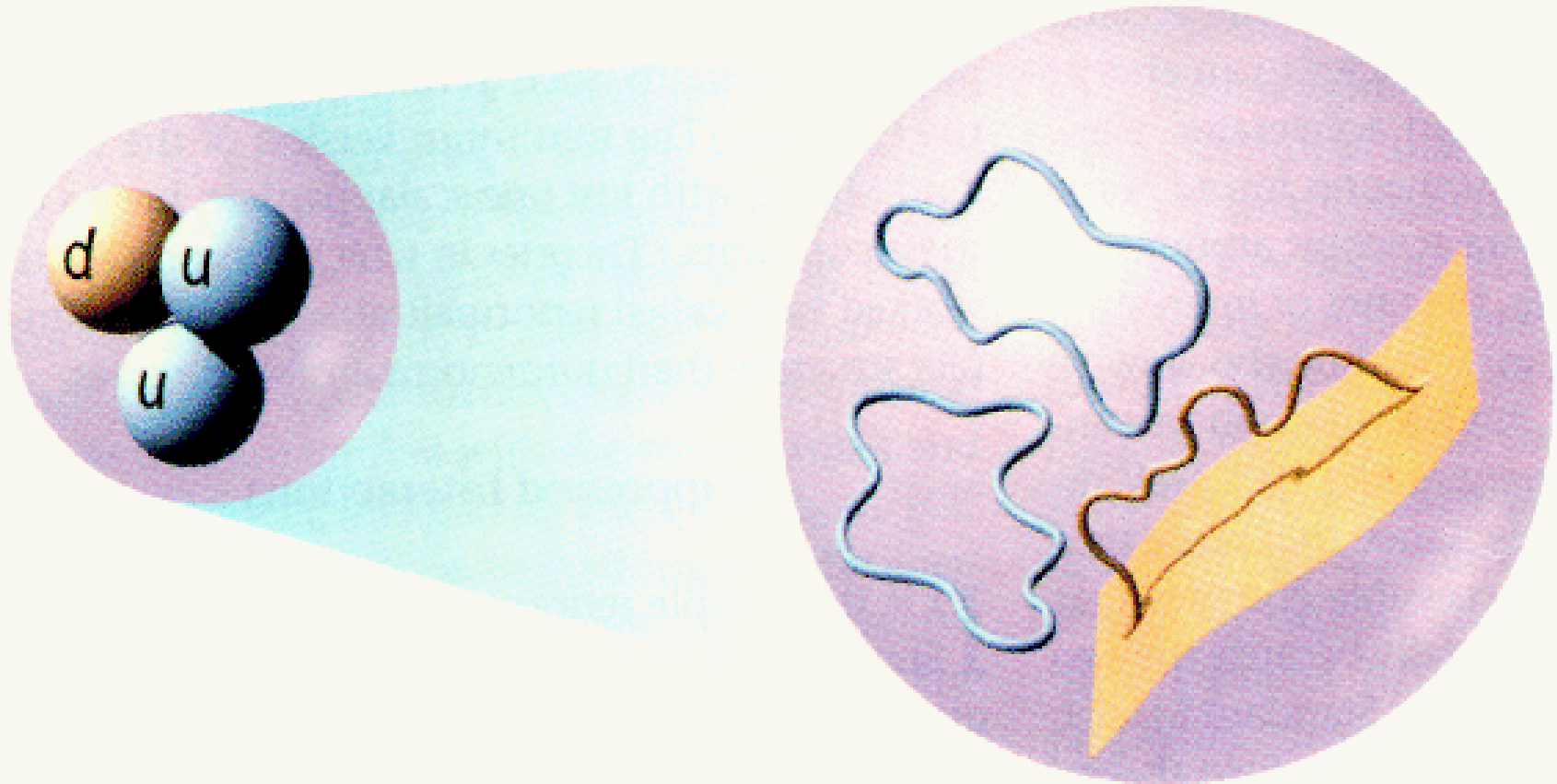


10^{-15} m

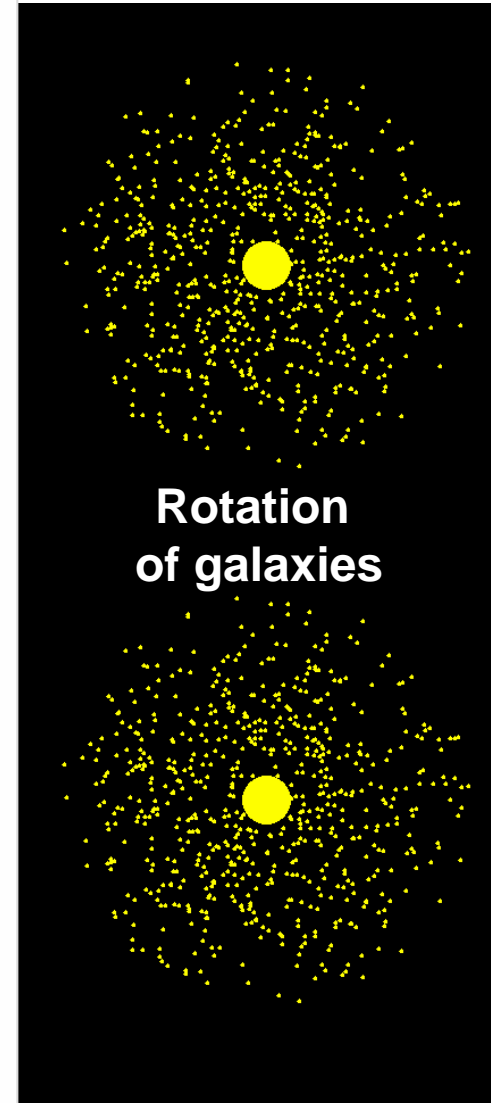
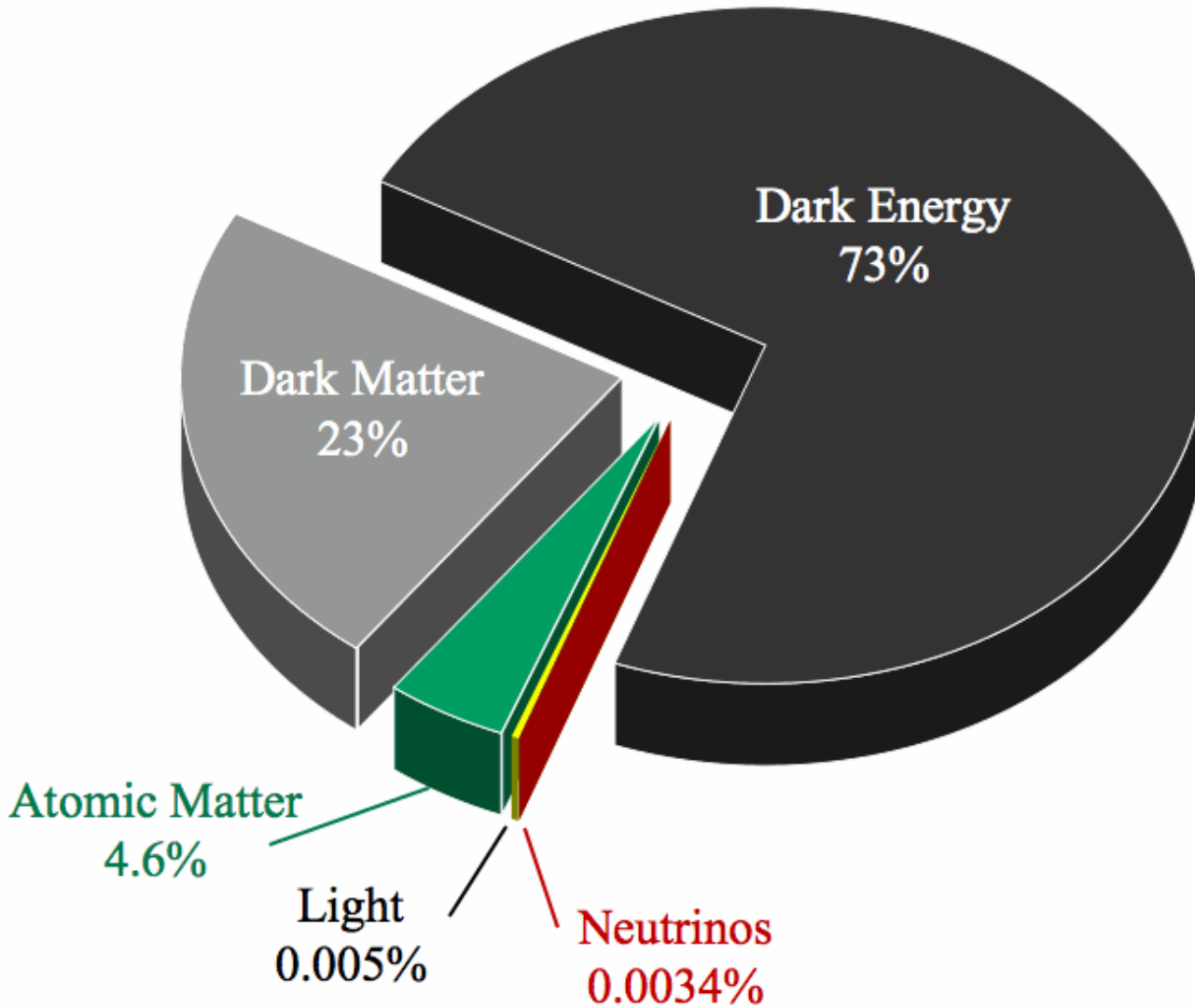
Quarks
and
Gluons

$<10^{-18}$ m

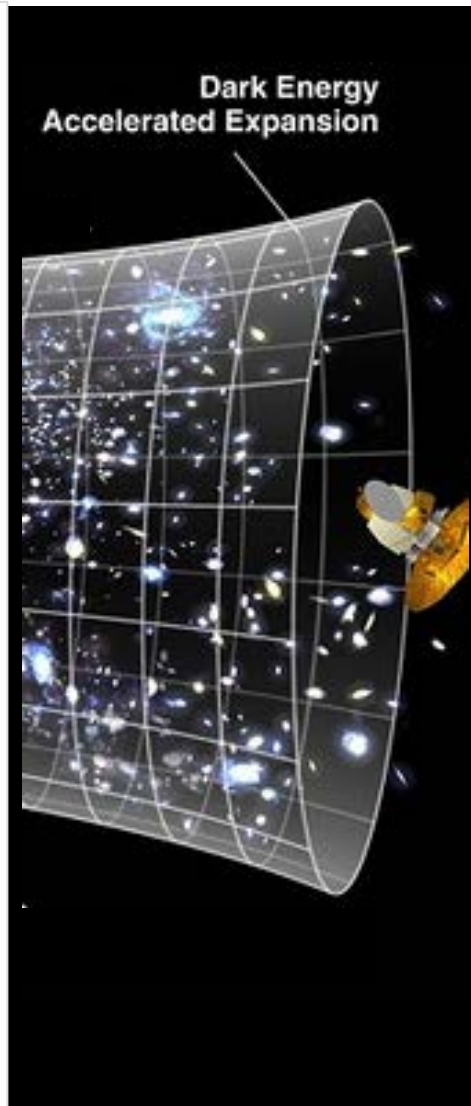
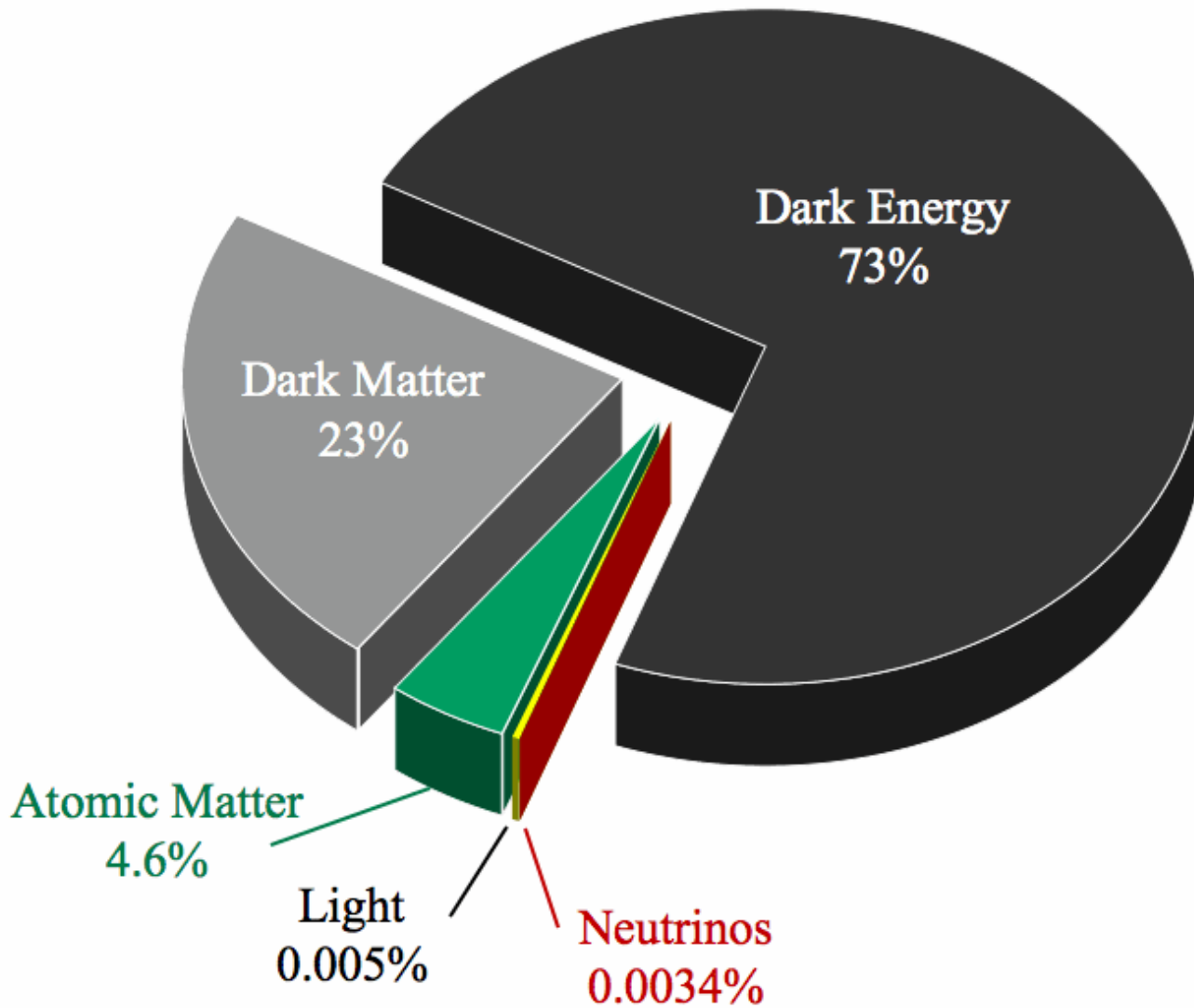
We don't know: Quark Substructure?




We don't know: **What is Dark Matter?**



We don't know: What is Dark Energy?





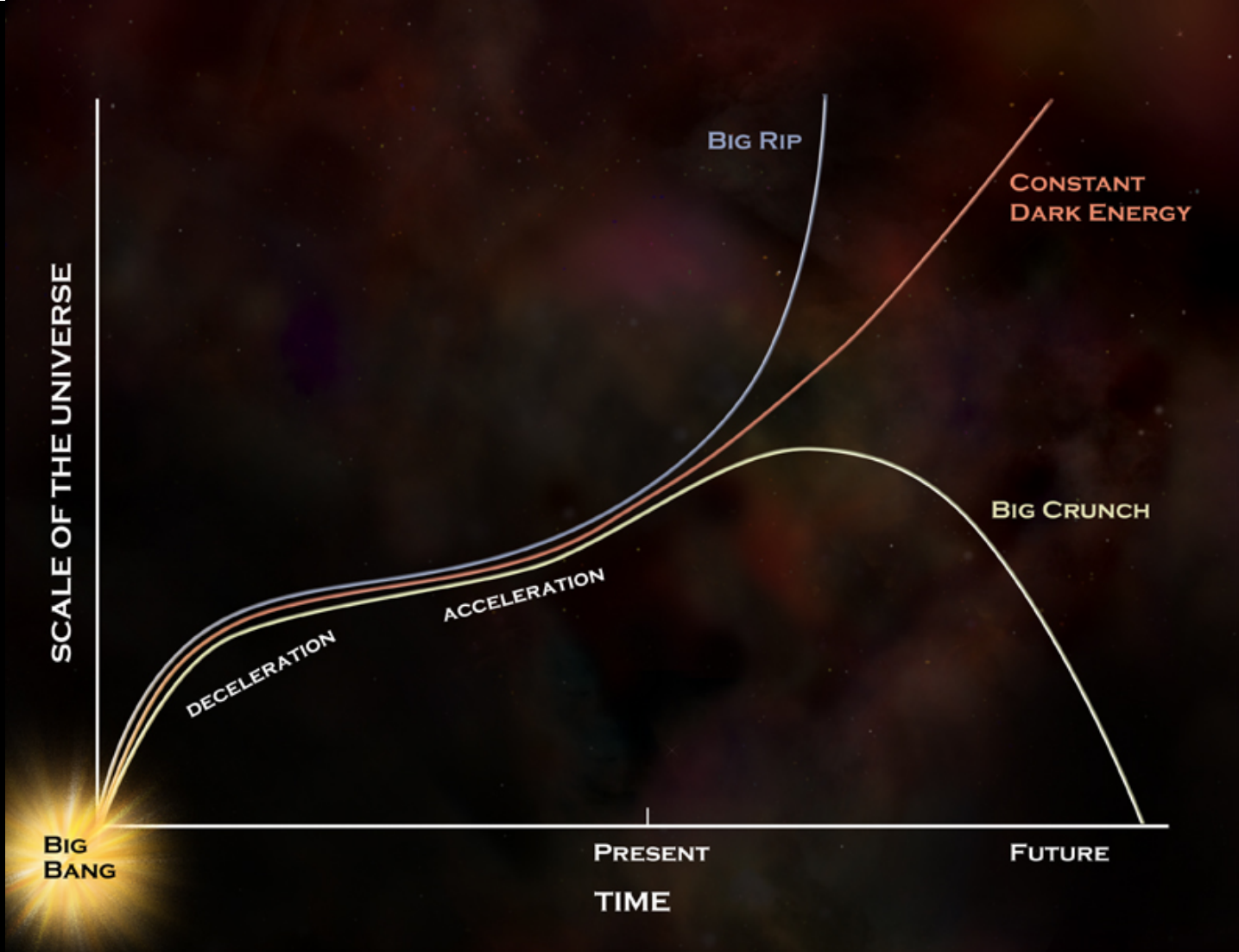
The Mystery of the Matter Antimatter Asymmetry



Why
isn't there
nothing?

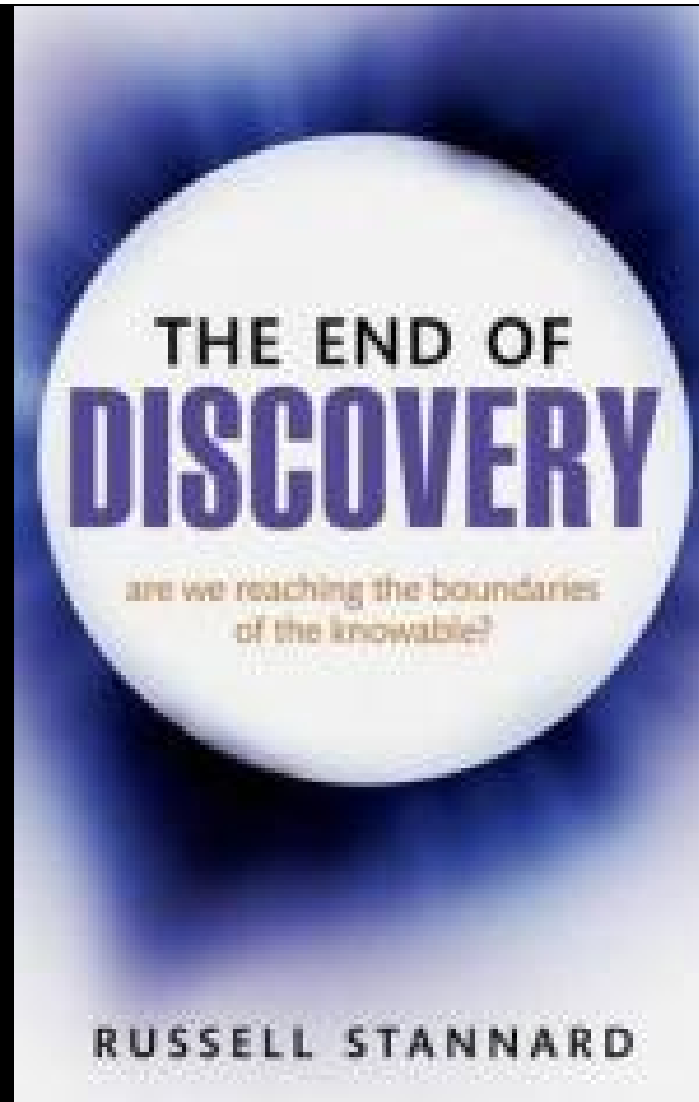
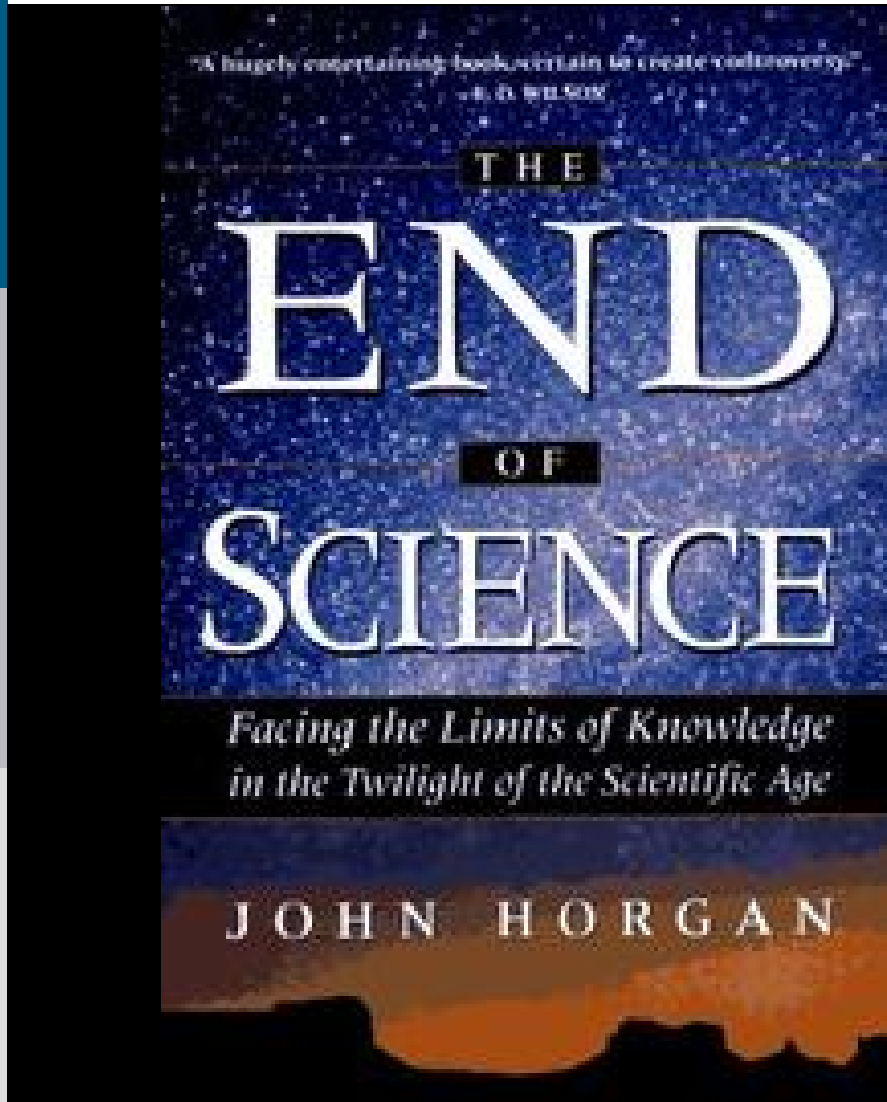
Researchers
hope to solve one of the
greatest mysteries

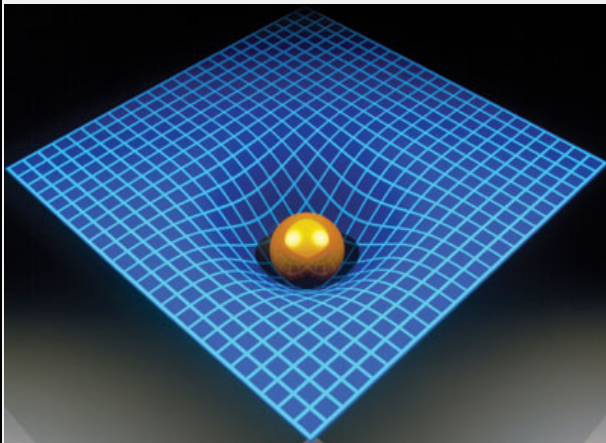
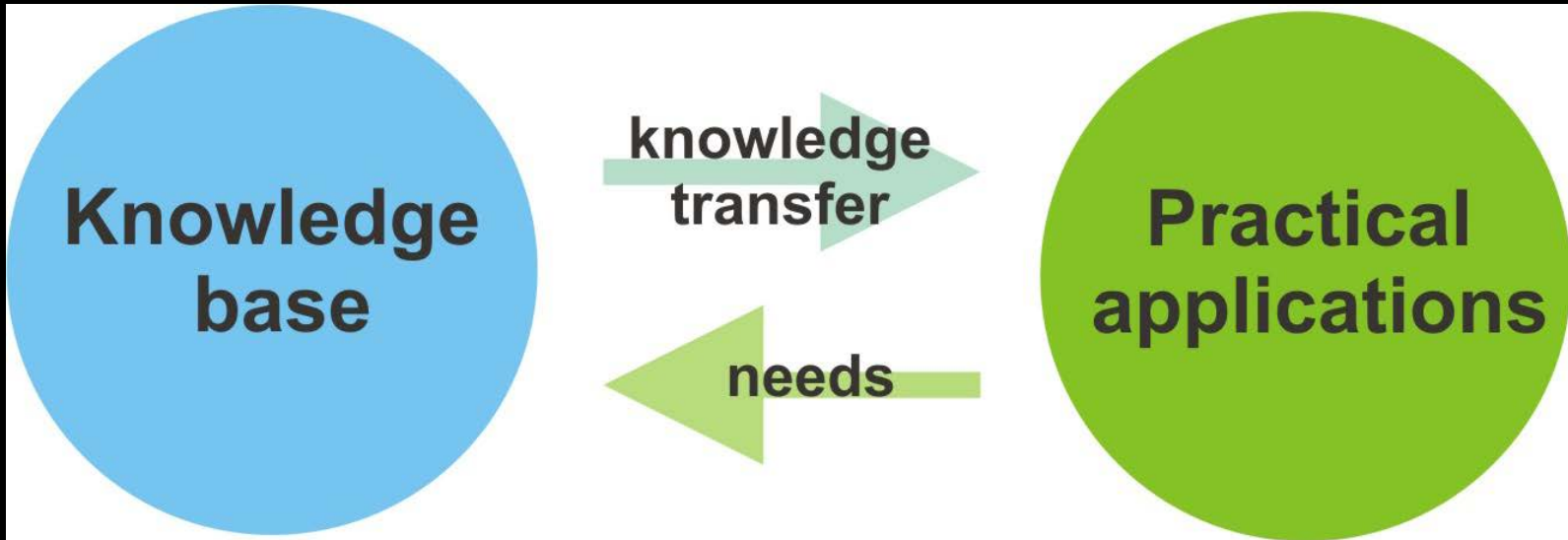
We don't know: Fate of the Universe?



We don't know that we don't know ...

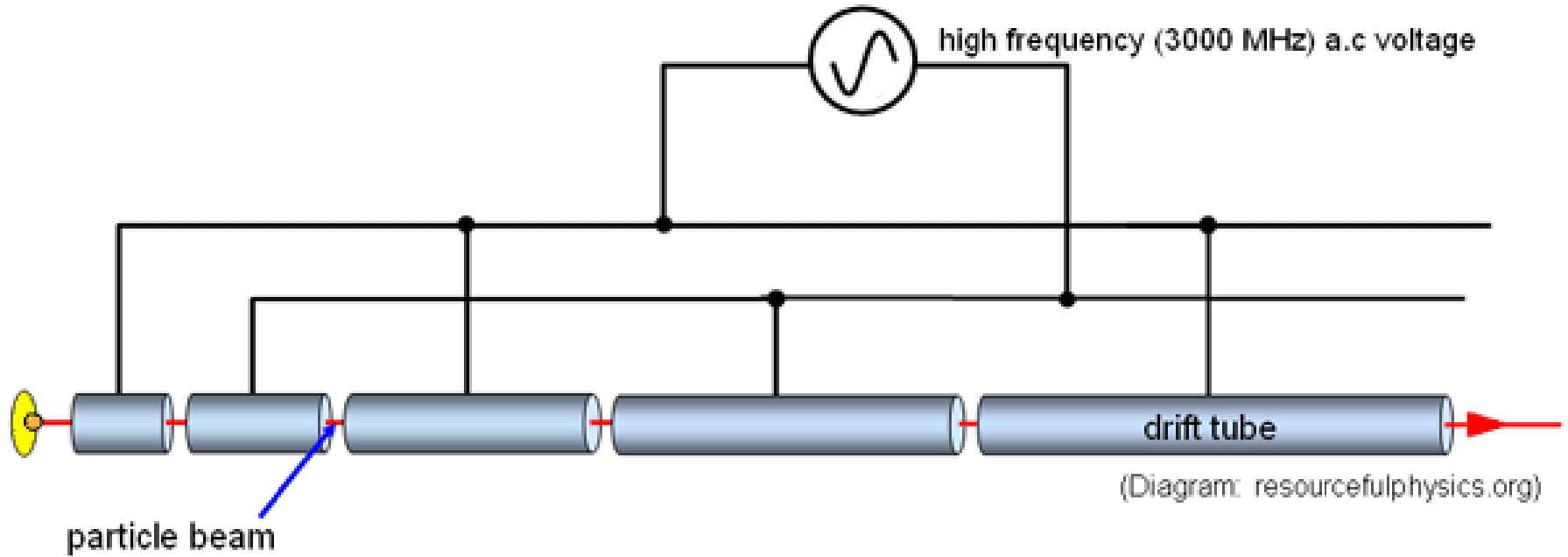
No End-of-Science anytime soon!





from theory
(**GTR**)
to its
ubiquitous
application
(**GPS**)

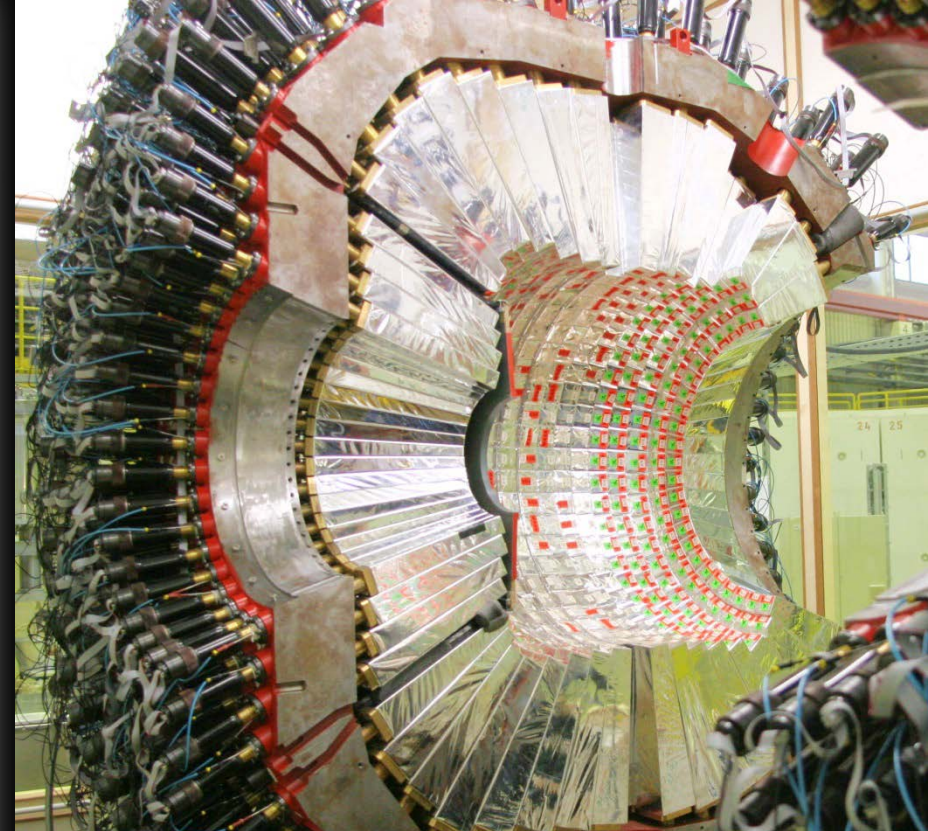
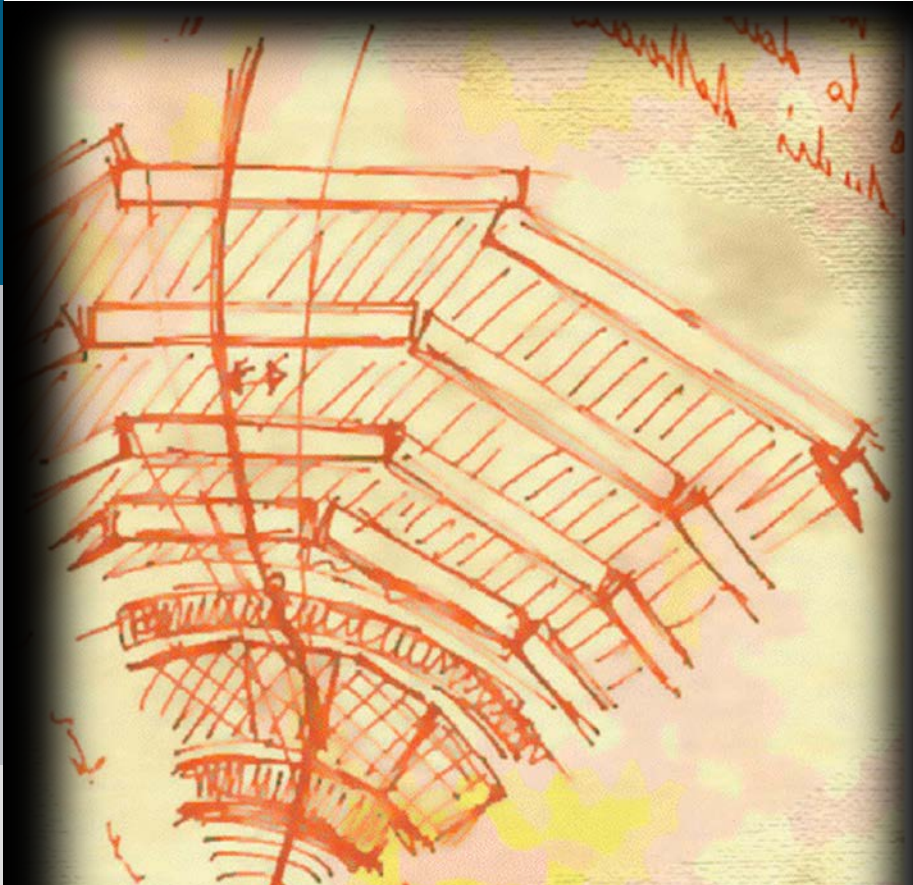




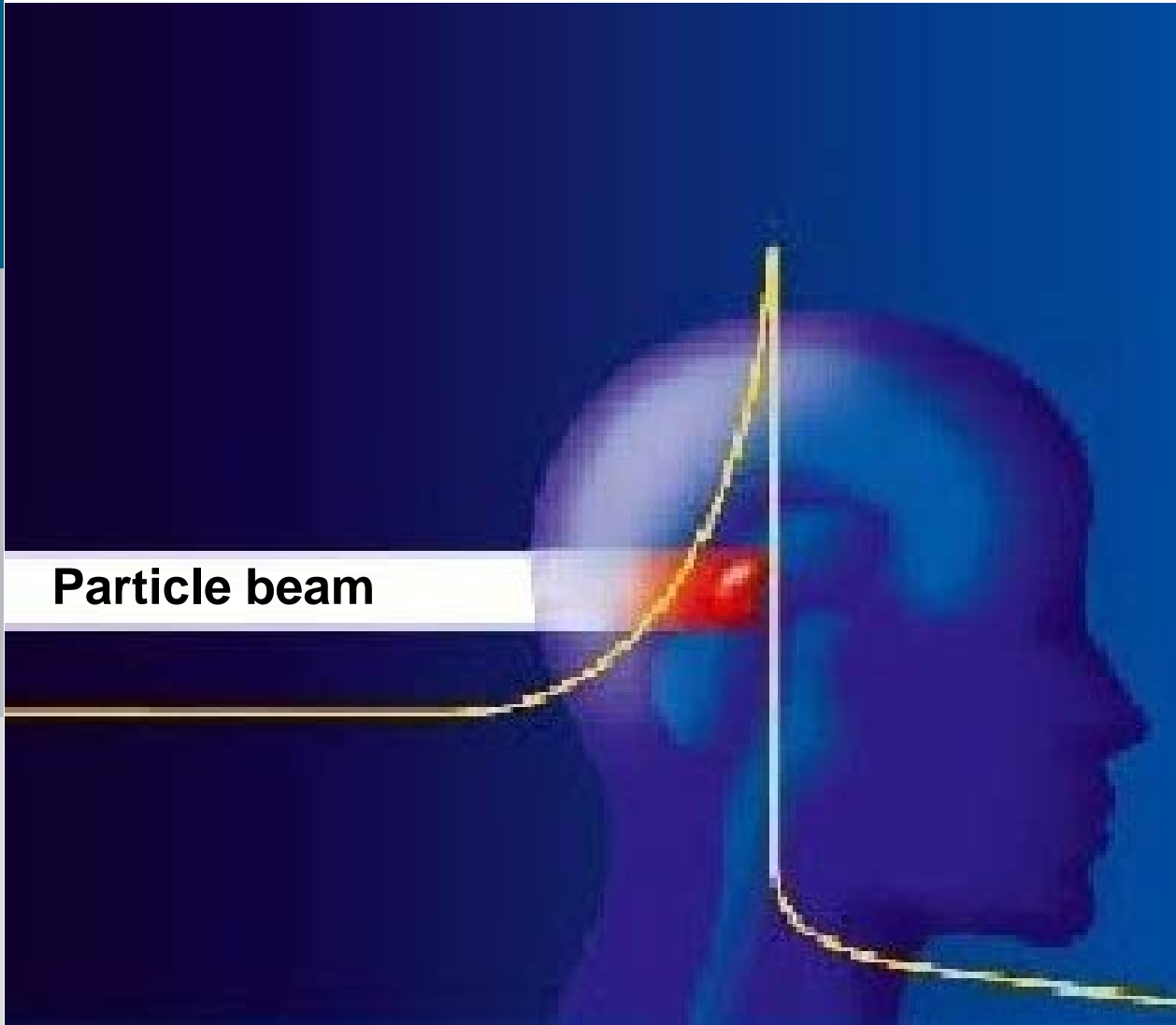
... to produce a „beam“ of particles



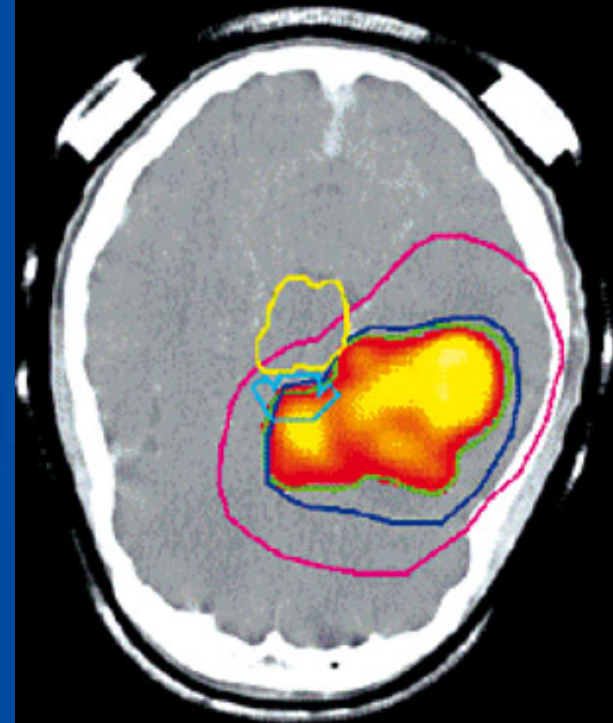
.. hit by the beam to produce „events“



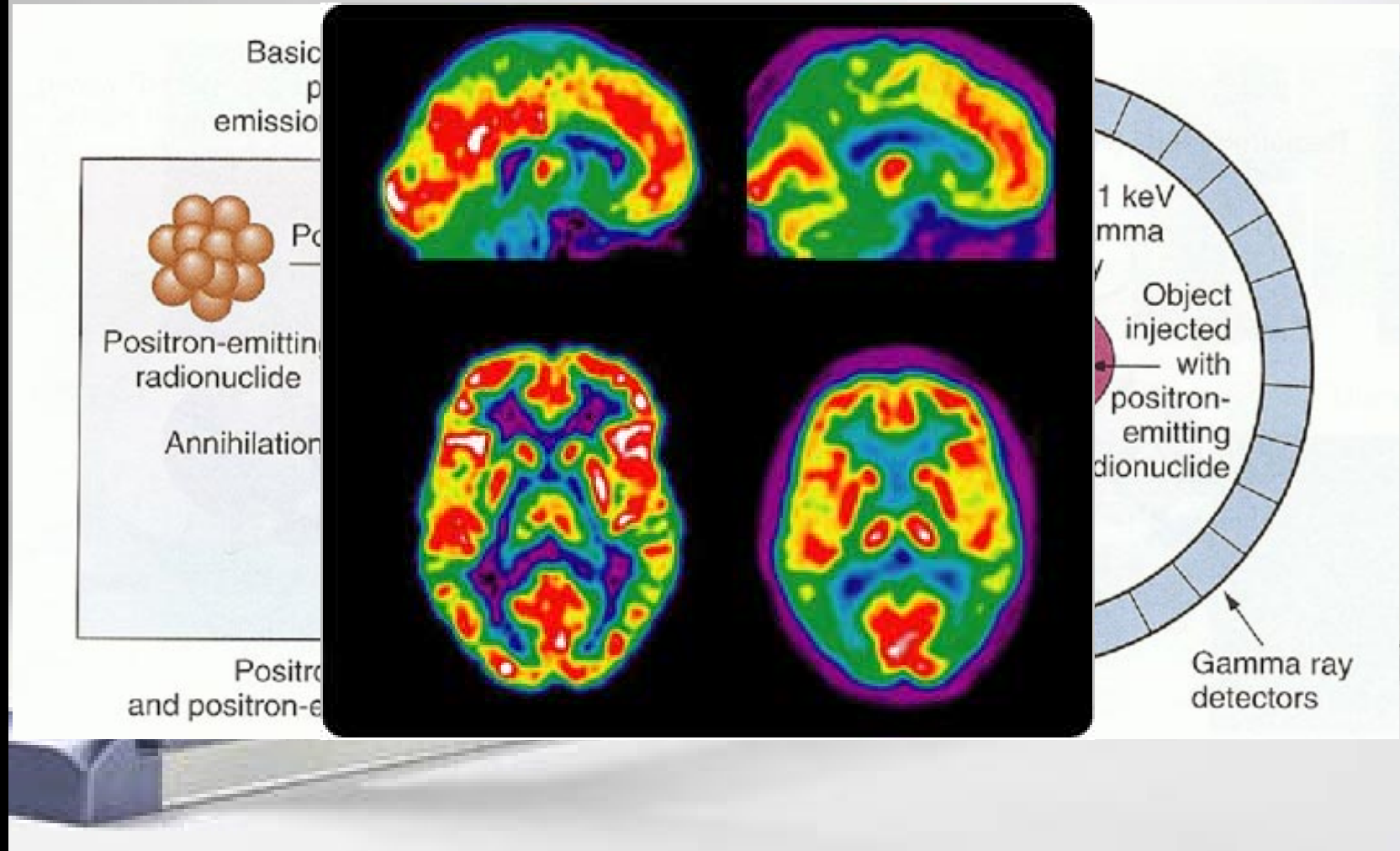
... to register and identify all parts of the „event“

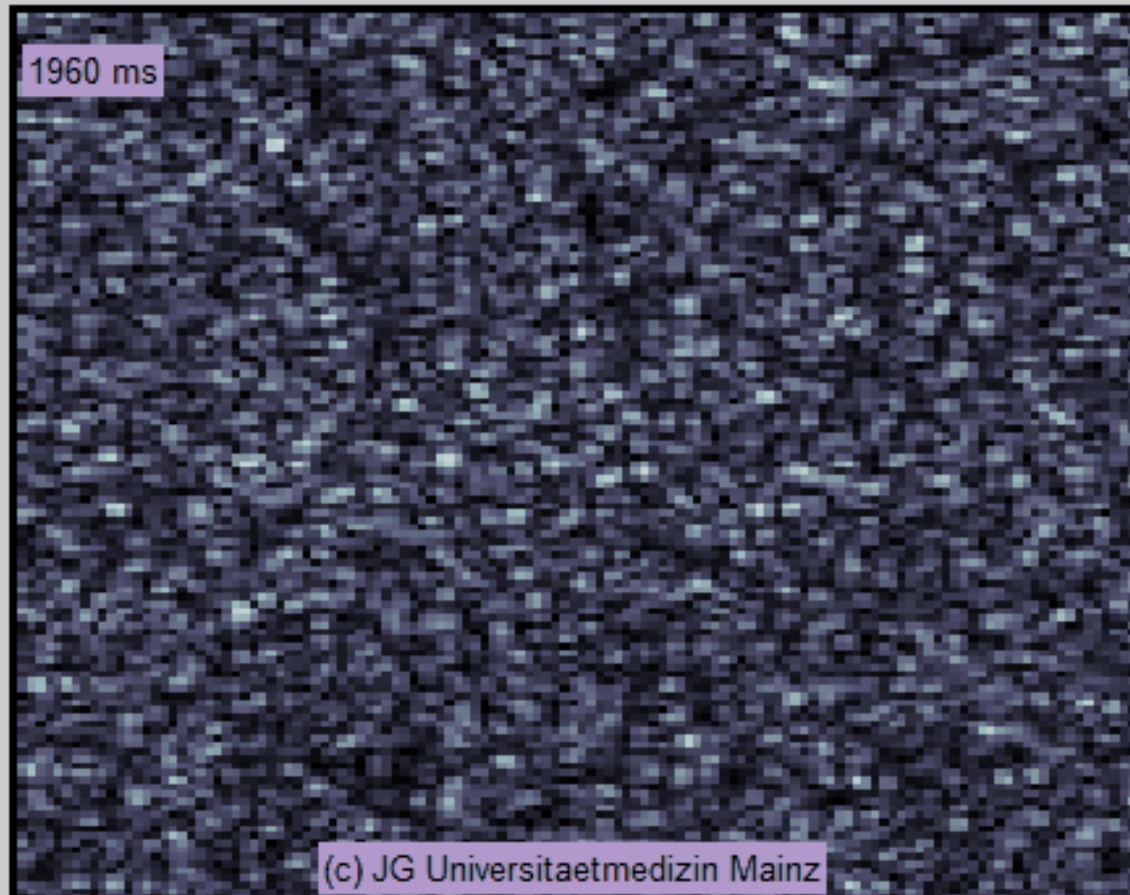


**MRI-PET
picture of
a brain tumor**



Applications (II) – PET Diagnostics







Autumn Lectures

Us

You



გმადლობთ