EPS
Roots & Future

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A.Z. is the youngest of the EPS founders.

This is why A.Z. knows
the roots of EPS:
The first Institution
where physicists from all Europe
(East-West-North-South)
wanted to be altogether.

During many years
before 1968
A.Z. was active in trying
to get the support of physicists
for the creation of this
new Institution.

The first great fellow was Lord Patrick Blackett, who was the leader of the most famous group of physics in the world and the winner of the Mediterranean Battle in the Second World War.

It is because of him that I had the privilege of spending an evening with his friend **Bertrand Russell** and getting to know his views on us physicists who were and are engaged at the frontiers of human knowledge in order to understand the Logic of Nature.

Professor Blackett and his friend Bertrand Russell were interested in identifying the real motor for progress in technological inventions that has allowed the quality of life to be at the level it is today.

This motor is the scientific discovery at the **1st level of Galilean Science**.

Today, the centre of everyone's attention are the problems concerning the **role of Science** as the source of high quality life instead of being (as it you was in the middle of last Century) just the source of high precision and high power weapons.

In the years after the Second World War, the problems on the **role of Science** were far from being of interest to the public. When I had the privilege of being in Professor Blackett's Physics group I learned a lot about these problems, essentially as Professor Blackett was engaged not only in the frontiers of Physics but also with problems concerning the **role of Science** in the Culture of our time.

THE ROLE OF SCIENCE IN THE CULTURE OF OUR TIME (*1% MODERN AND 99% PRE-ARISTOTELIC*)

For the Culture of our Time

(1% Modern and 99% Pre-Aristotelic)

called Modern

it is as if neither

Rigorous <u>Theoretical</u> Logic

(Mathematics)

nor

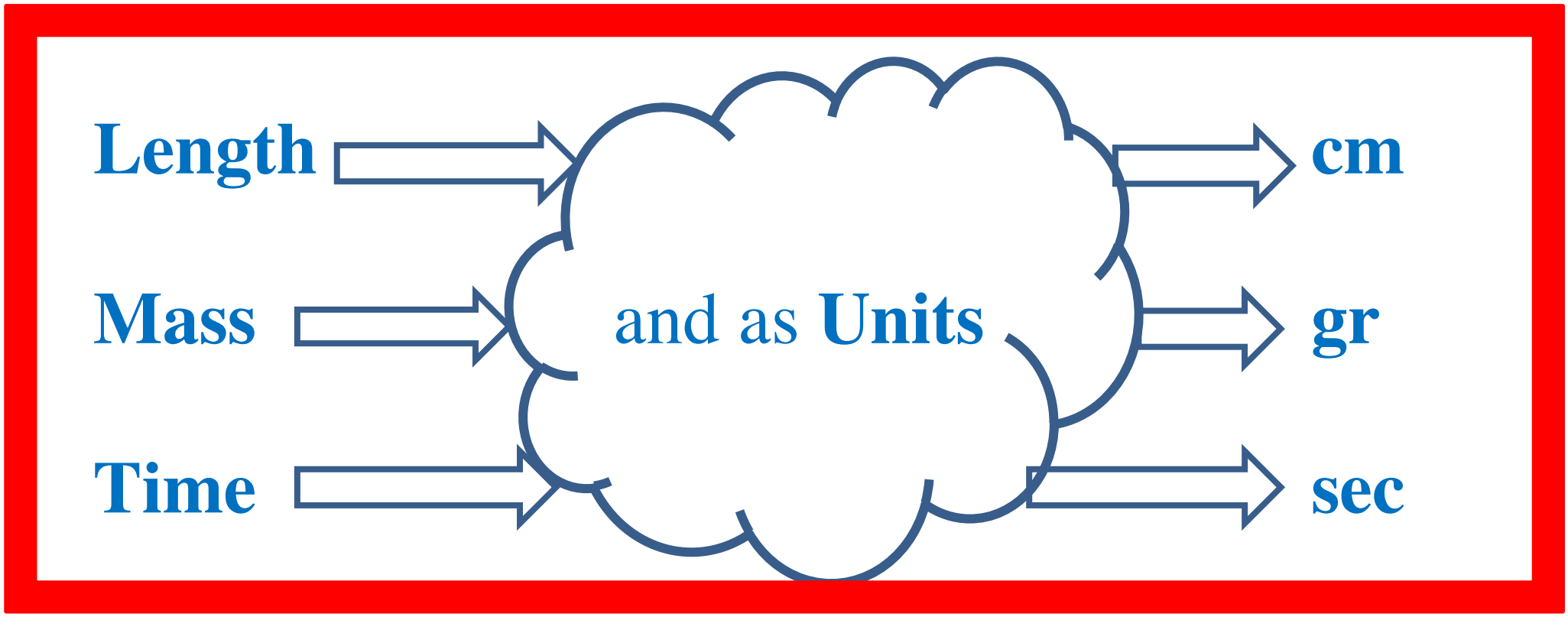
Rigorous <u>Experimental</u> Logic

(Science)

HAD BEEN DISCOVERED.

THE PROOF FOLLOWS

In everyday's life we use as **Basic Quantities**



In his universal outlook of the world – independent of our restricted environment – Planck in 1899 wanted that the fundamental units of **mass**, **length** and **time** to depend only on the values of the Fundamental Constants of Nature:

c (the speed of light),
h (the Planck constant) and
G (the Newton gravitational coupling).

These quantities had a special meaning for Planck [1]:

"*These quantities retain their natural significance as long as the Law of Gravitation and that of the propagation of light in a vacuum and the two principles of thermodynamics remain valid; they therefore must be found always to be the same, when measured by the most widely differing intelligence according to the most widely differing methods*".

The way Planck considered these quantities it is remarkable:

"*In the new system*
of measurement
each of the four preceding
Constants of Nature
(G, h, c, k)
has the value one".

This is
the meaning of
measuring lengths,
times,
masses
and temperatures
in Planck's units.

Our world is coming
from the Planck Universe
where the units of the
BASIC QUANTITIES
are not cm, gr, sec
but the three fundamental
Constants of Nature:
c, h, G_N

Taking these units,
the following values come out:

$$\Delta T = 45 \cdot 10^{-45} \cong 5 \cdot 10^{-44} sec$$

$$\Delta X = 10^{-33} cm$$

$$\Delta E = 10^{19} GeV = 10^{28} eV$$

When Planck
discovered these **units**
no one knew what
these quantities have to do
with our Universe.

This is the reason why
Planck's discovery was forgotten
during the XX Century.

But now these quantities
are those where our life comes from.
In fact **ΔT, ΔX, ΔE**
are the units of the 1st BIG BANG.

10^{-44} sec is the Time of the 1st BIG BANG

10^{28} eV is the Energy of the 1st BIG BANG

10^{-33} cm is the Universe Radius during the 1st BIG BANG

This means that
our Universe has its
quantitative basis in the
intellectual venture whose
author is Max Planck [1].

Planck included the Boltzmann constant k which converts the units of energy into units of temperature. This allowed Planck to have a fundamental value also for the temperature, 3.5×10^{32} kelvins (K).

Here are the orders of magnitude of Planck's units in the "Planck Universe":

$$\begin{aligned}
\text{Length} &= (G \cdot h / c^3)^{1/2} &&\simeq 10^{-33}\ \text{cm} \\
\text{Time} &= (G \cdot h / c^5)^{1/2} &&\simeq 10^{-44}\ \text{s} \\
\text{Mass} &= (h \cdot c / G)^{1/2} &&\simeq 10^{-5}\ \text{g} \\
\text{Temperature} &= k^{-1} \cdot (hc^5/G)^{1/2} &&\simeq 10^{32}\ \text{K}.
\end{aligned}$$

When Planck was expressing his ideas on the meaning of his fundamental natural units there was neither the Big Bang nor the Einstein equation.

And no one knew that the Einstein equation had a solution, discovered by Karl Schwarzschild [2], which describes the gravitational field of a massive point-like particle.

The evolution of the Universe seems to follow the conditions illustrated in Figures. 1 and 2 whose origin is the Schwarzschild equation and the three Fundamental Constants of Nature.

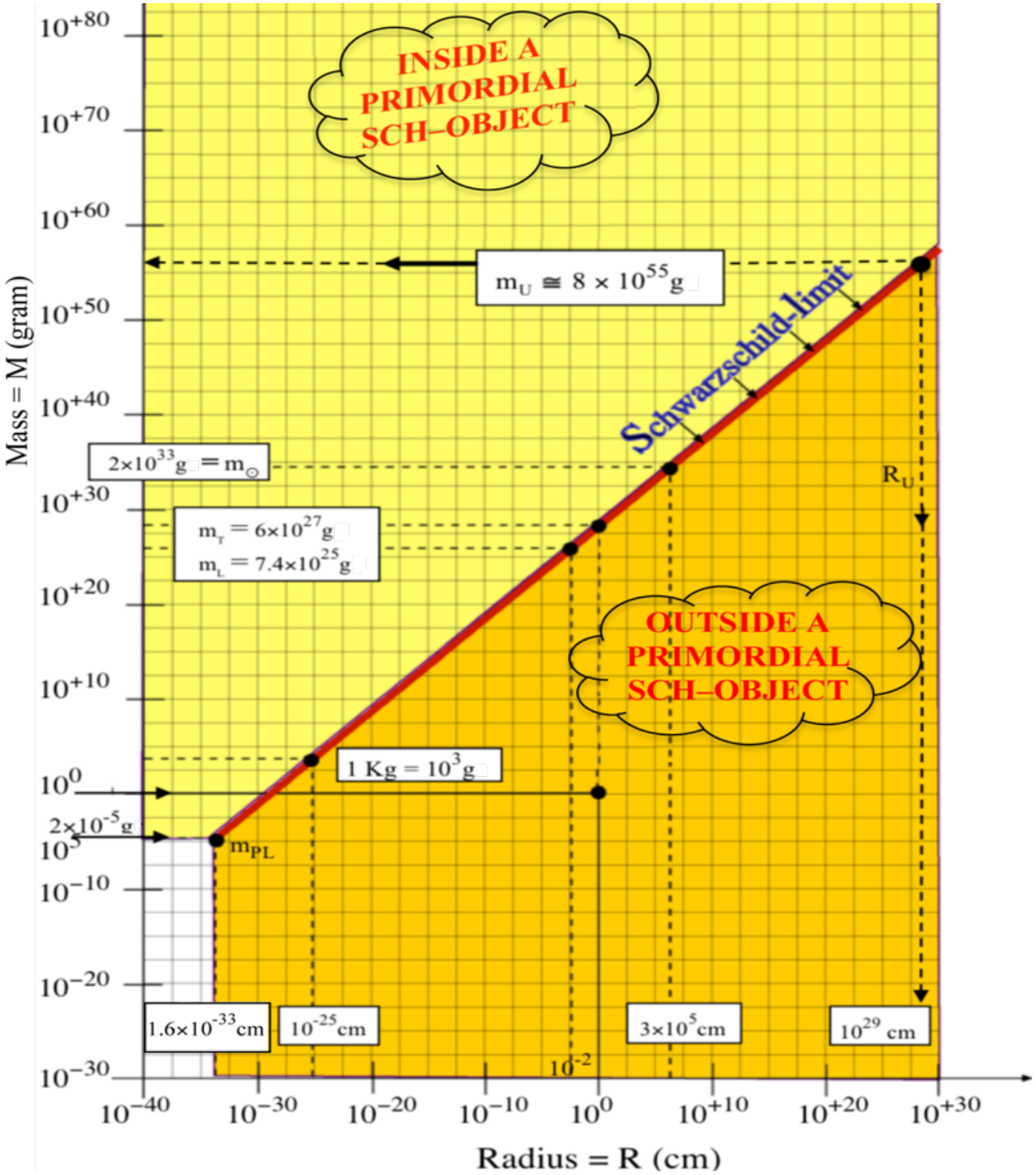

INSIDE A PRIMORDIAL SCH–OBJECT
OUTSIDE A PRIMORDIAL SCH–OBJECT
Schwarzschild-limit
$m_U \cong 8 \times 10^{55}$g
2×10^{33}g = $m_\odot$
$m_T = 6\times10^{27}$g
$m_L = 7.4\times10^{25}$g
1 Kg = 10^3g
2×10^{-5}g
m_{PL}
R_U
1.6×10^{-33}cm
10^{-25}cm
10^{-2}
3×10^{5}cm
10^{29} cm
Mass = M (gram)
Radius = R (cm)
10^{+80}
10^{+70}
10^{+60}
10^{+50}
10^{+40}
10^{+30}
10^{+20}
10^{+10}
10^{0}
10^{-5}
10^{-10}
10^{-20}
10^{-30}
10^{-40}
10^{-30}
10^{-20}
10^{-10}
10^{0}
10^{+10}
10^{+20}
10^{+30}

Figure 1

Figure 1: The Schwarzschild law between the radius of the horizon and the mass from the smallest to the largest SCH–object.

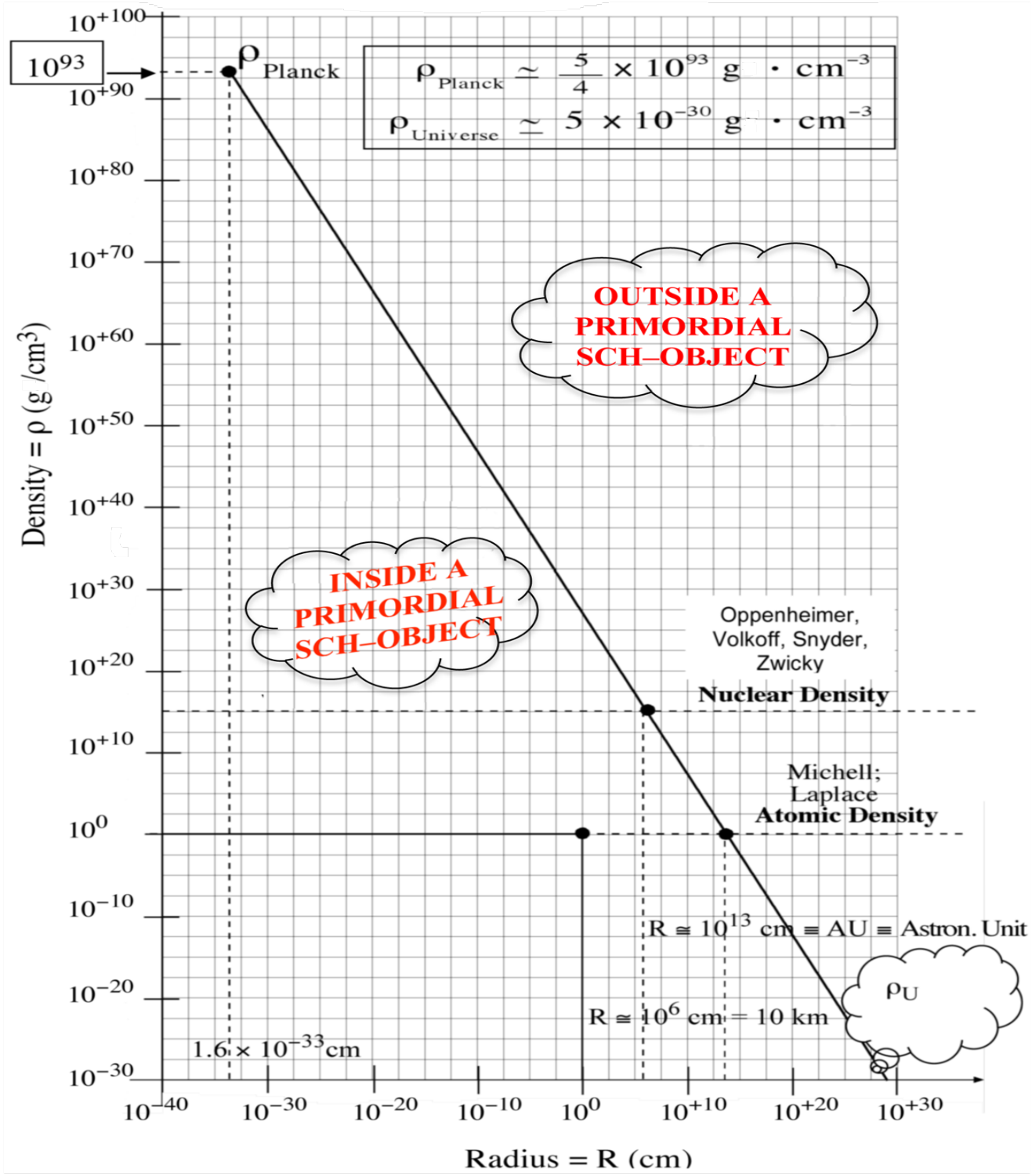

10^{+100}
10^{93}
ρ_{Planck}
$\rho_{Planck} \simeq \frac{5}{4} \times 10^{93}\ g \cdot cm^{-3}$
$\rho_{Universe} \simeq 5 \times 10^{-30}\ g \cdot cm^{-3}$
10^{+90}
10^{+80}
10^{+70}
10^{+60}
10^{+50}
10^{+40}
10^{+30}
10^{+20}
10^{+10}
10^{0}
10^{-10}
10^{-20}
10^{-30}
Density = ρ (g /cm³)
OUTSIDE A PRIMORDIAL SCH–OBJECT
INSIDE A PRIMORDIAL SCH–OBJECT
Oppenheimer, Volkoff, Snyder, Zwicky
Nuclear Density
Michell; Laplace
Atomic Density
$R \cong 10^{13}$ cm ≡ AU ≡ Astron. Unit
ρ_U
$R \cong 10^{6}$ cm = 10 km
1.6×10^{-33}cm
10^{-40}
10^{-30}
10^{-20}
10^{-10}
10^{0}
10^{+10}
10^{+20}
10^{+30}
Radius = R (cm)

Figure 2

Figure 2: The relation which exists between the value of the SCH radius (R_{SCH}) and the corresponding density (ρ_{SCH}), from the smallest (the Planck Universe) to the largest SCH–object (the Universe now).

Now the rigorous description of

α_1 α_2 α_3

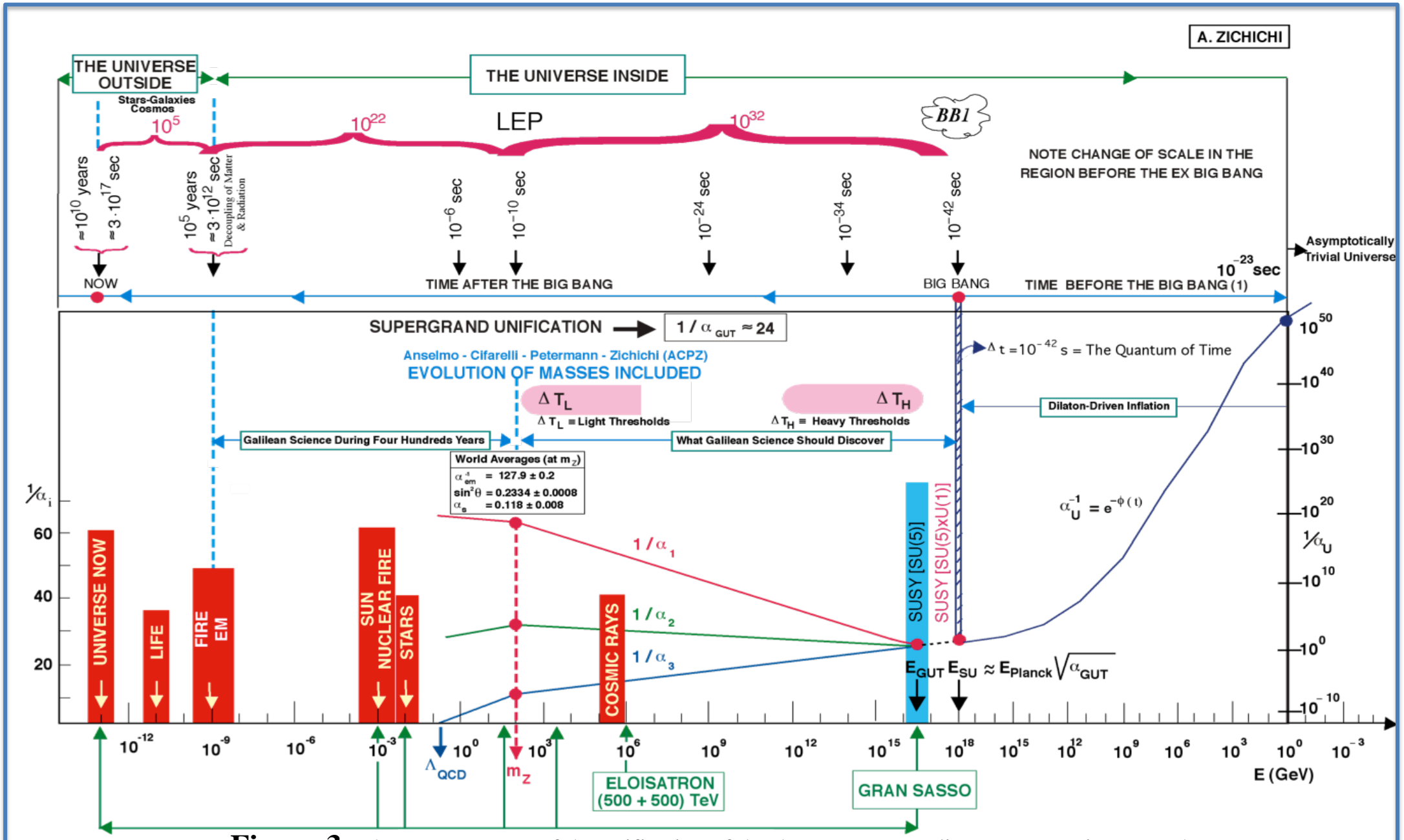


Figure 3: The present status of the unification of the three gauge couplings α_1 α_2 α_3 is reported. This is the most accurate description of the unification whose mathematics is in **Figure 4**.

THE UNIFICATION OF ALL FUNDAMENTAL FORCES AND THE EGM EFFECT

The three lines (α_1^{-1}, α_2^{-1}, α_3^{-1}) in **Figure 3** result from calculations executed with a supercomputer using the following system of equations:

$$\mu \frac{d\alpha_i}{d\mu} = \frac{b_i}{2\pi} \alpha_i^2 + \sum_j \frac{b_{ij}}{8\pi^2} \alpha_i \alpha_j$$

α_i, α_j (with $i = 1, 2, 3$; and $J = 1, 2, 3$ but $i \neq j$).

This is a system of coupled non-linear differential equations which is valid to mathematically describe an experiment where threee quantities play a fundamental role. In our case the three fundamental quantities are the gauge couplings (α_1, α_2, α_3) which vary with "μ", the basic parameter which depends on the energy of the elementary process, from the maximum level of Energy (Planck Scale) to the energy level of our world. **During more than ten years (from 1979 to 1991), no one had realized that the energy threshold for the existence of the Superworld was strongly dependent on the "running" of the masses.**

This is now called: **the EGM effect** (from the initials of Evolution of Gaugino Masses). This effect produces a factor 700 in the threshold for the lightest supersymmetry particle. No one knows the value of the threshold Energy for the production of the lightest supersymmetry particle. The EGM effect lowers this value by a factor 700. Suppose that somebody would say that the **threshold is at 700 TeV, thanks to the EGM effect** this value is going to **be 1 TeV**.

Figure 4

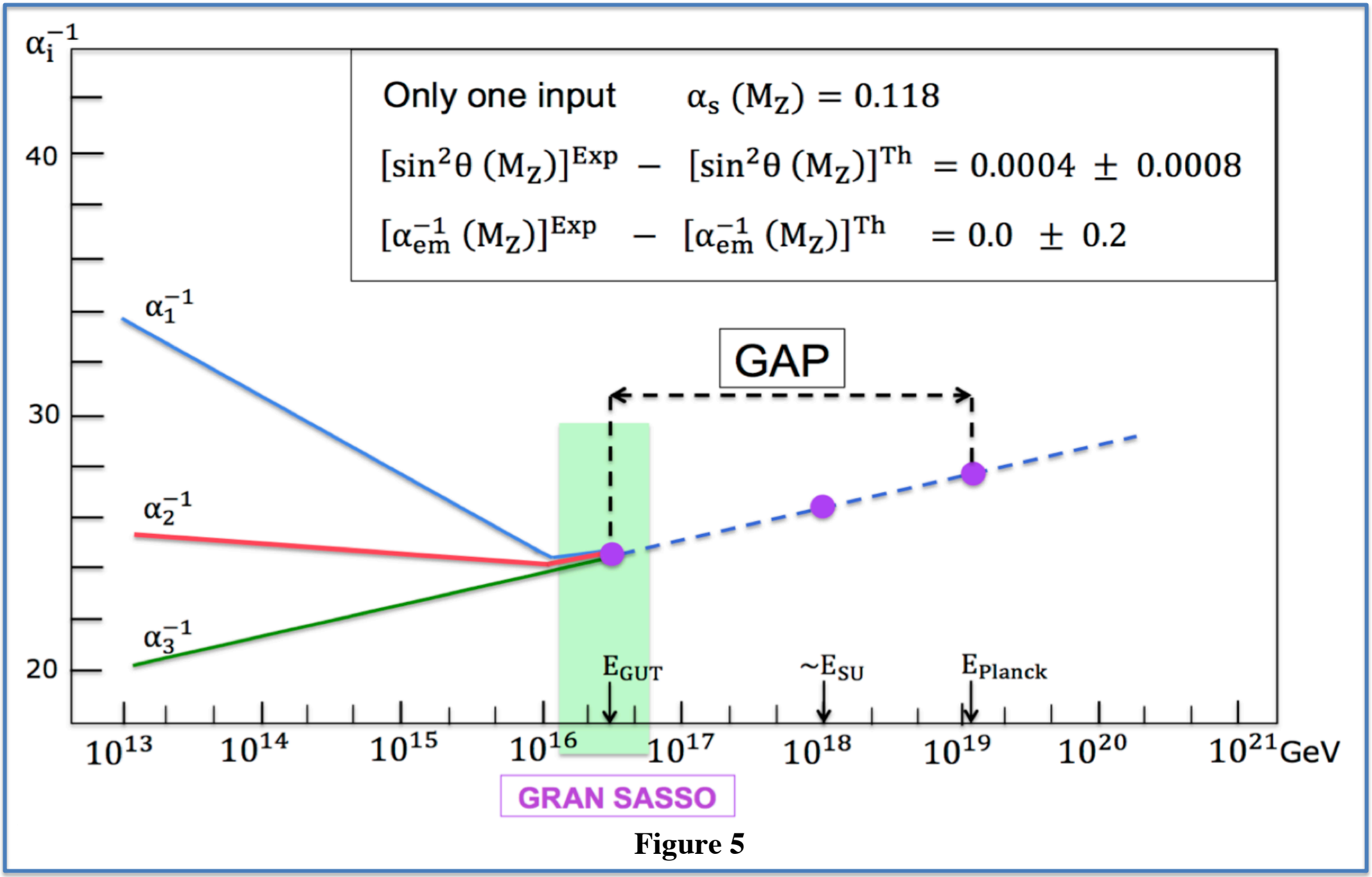

α_i^{-1}
Only one input $\alpha_s\,(M_Z) = 0.118$
$[\sin^2\theta\,(M_Z)]^{Exp} - [\sin^2\theta\,(M_Z)]^{Th} = 0.0004 \pm 0.0008$
$[\alpha_{em}^{-1}\,(M_Z)]^{Exp} - [\alpha_{em}^{-1}\,(M_Z)]^{Th} = 0.0 \pm 0.2$
40
30
20
α_1^{-1}
α_2^{-1}
α_3^{-1}
GAP
E_{GUT}
$\sim E_{SU}$
E_{Planck}
10^{13} 10^{14} 10^{15} 10^{16} 10^{17} 10^{18} 10^{19} 10^{20} 10^{21}GeV
GRAN SASSO

Figure 5

In the very first days of EPS the most famous physicist from Siberia Veniamin A. Sidorov came to Geneva, and he emphasized the relevance of Siberia being a member of USSR.

When A.Z. was in Physics Institutes in Siberia (Novosibirsk) A.Z. realized that our colleagues in this part of USSR were, what we call in our

Democratic Structures

Opposition

In fact all fellows
who had something to say
against Moscow were
immediately displaced in
Siberia.

The Siberian fellow,
Veniamin Sidorov,
was a very active member
of all our EPS actions.
You can find him
in the following picture,
many years after
the EPS foundation.

The Holy Father, Pope John Paul II receiving in the Vatican the President of the European Physicists, A.Z., accompanied by the Council of the Presidency of the European Physical Society (EPS).

The next meeting took place later with fifty members of EPS whose names follow:

Dr. R.S. Pease, Abingdon
Prof. G.A. Smolensky, Leningrad
Dr. T. Riste, Kjeller
Mrs. L.A. Thomas, Wembley
Dr. P. Radvanyi, Orsay
Dr. B. Dreyfus, Grenoble
Prof. K.K. Rebane, Tallin
Prof. K.-H. Hausser, Heidelberg
Prof. B. Robinson, Paris
Prof. W. Martienssen, Frankfurt/Main
Dr. L. Cohen, London
Prof. E.R. Andrew, Nottingham
Dr. F. James, Geneva
Prof. E.R. Dobbs, London
Dr. A. Strzalkowski, Cracow
Prof. V. Goldenski, Moscow
Prof. L.A. Thomas, Wembley
Acad. A. Datzeff, Sofia
Prof. R.A. Ricci, Padua
Mr. E.N. Shaw, Geneva
Prof. E.A. Müller, Geneva
Prof. V. Ruuskanen, Jyvaskylä
Dr. C. Le Pair, Utrecht
Prof. I.R.A.M. Hoogenboom, Utrecht
Prof. A. Zichichi, Geneva
Prof. V. Sidorov, Novosibirsk
Mr. J. Béné, Geneva
Prof. G.-J. Béné, Geneva
Prof. A. Lösche, Leipzig
Prof. S. Kapitza, Moscow
Prof. G. Picozza, Rome
Prof. G. Preparata, Geneva
Prof. M. Guenin, Geneva
Prof. R. Scrimaglio, Frascati
Dr. J. Fischer, Prague
Prof. L. Kerwin, Ottawa
Prof. K. Hoselitz, UK
Mrs. A. Hoselitz, UK
Prof. J.M. Caraça, Lisbon
Dr. W.F. Druyvesteyn, Eindhoven
Prof. G. Eilenberger, Jülich
Prof. E. Matthias, Berlin
Prof. A. Milojevič, Belgrade
Prof. C. Nordling, Uppsala
Dr. E.W. Otten, Geneva

The roots of EPS
are in our activity
devoted to convince
the most relevant fellows
to be with us
in order to give life
to new Institution called

EPS.

A fellow who was of great help is **Peter Higgs** who in 1964 had the correct idea of solving the problem of allowing masses not to be zero.

Nobody could predict that
this problem needed
many decades (1964–2012)
to be experimentally proved to be
in the Logic of Nature.
During these decades
the **Higgs–meson** became the
"**God–Particle**".

In the Physics steps we started with the proof that the first discovery (1967) of the Higgs meson was not correct (1969). Then 50 years of experimental attempts to find this meson produced the "**God–Particle**".

The presence of SIBERIA: neither geographical nor political boundaries for our fellows to be members of **EPS**

THE ROOTS AND THE FUTURE

In the **1985 Geneva** meeting Gorbachev & Reagan adopted our **EPS** definition of Secret Laboratories

The **Enemy** Number **One** of Peace in the World

are the Secret Laboratories

Reagan & Gorbachev:

We will open
the Secret Laboratories

Now 2018

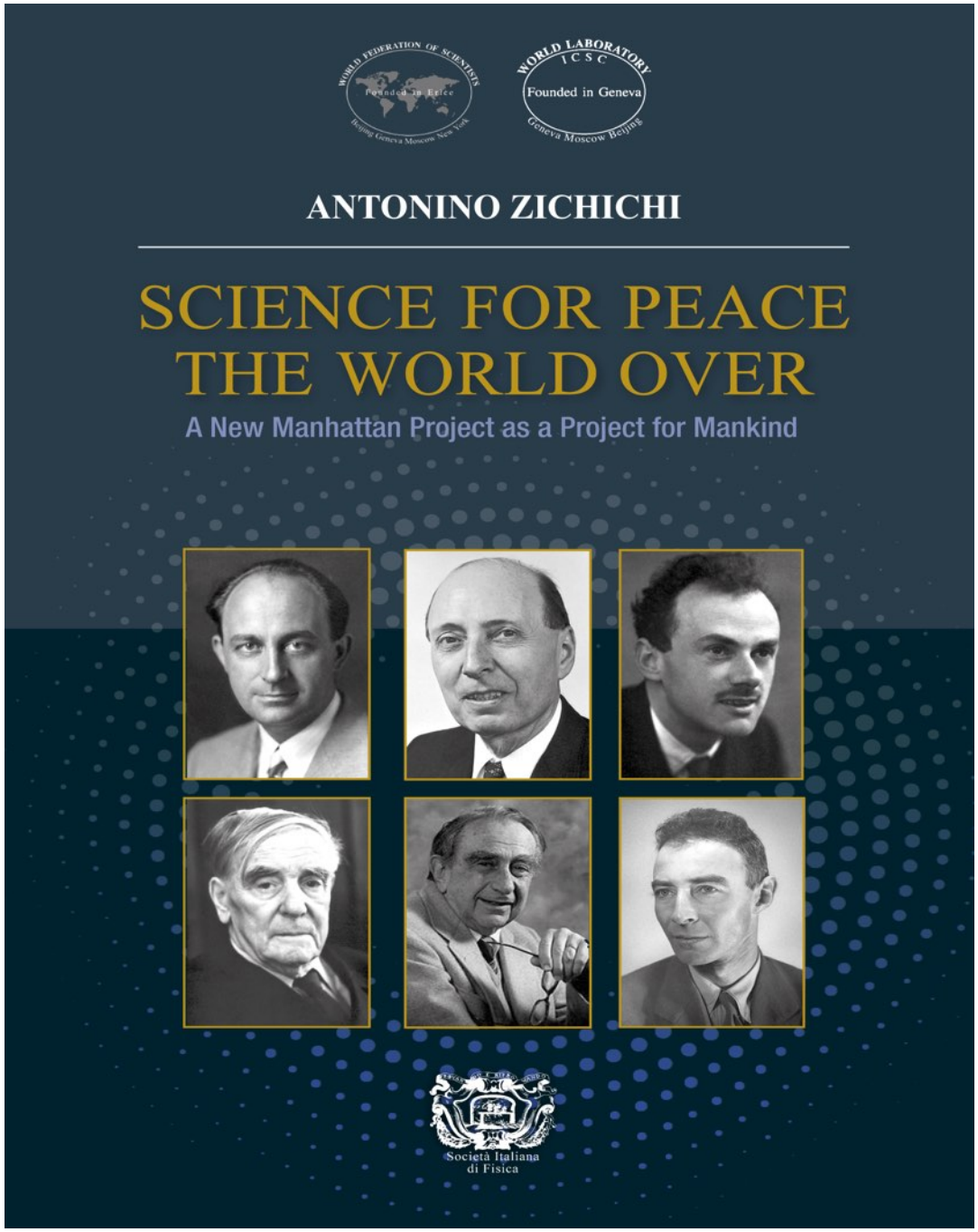
The Secret Laboratories
are still **closed**
but the project for
East-West-North-South
Scientific Collaboration
is **going on**.

Being Physicist
we cannot limit ourselves
to uttering words:
We must propose a **Project**

Science for Peace the World Over

The Future of EPS must be linked to

- Science for Peace the World Over which comes after
- The New Manhattan Project
- Project for Mankind


WORLD FEDERATION OF SCIENTISTS
Founded in Erice
Beijing Geneva Moscow New York
WORLD LABORATORY
I C S C
Founded in Geneva
Geneva Moscow Beijing
ANTONINO ZICHICHI
SCIENCE FOR PEACE
THE WORLD OVER
A New Manhattan Project as a Project for Mankind
Società Italiana
di Fisica

The Physics coupled with EPS

The God Particle

- 1964 (im) Higgs
- 1967 The Higgs meson is discovered and called S^0.
- 1969 The S^0 does not exist.

THE EFFECTIVE ENERGY

puts all production processes on the same basis, no matter if the interaction is Strong, Electromagnetic, Weak.

The multitude of final states produced by pairs of interacting particles, in Strong, Electromagnetic (EM) and Weak processes becomes **only one state** if the Effective Energy is the same:

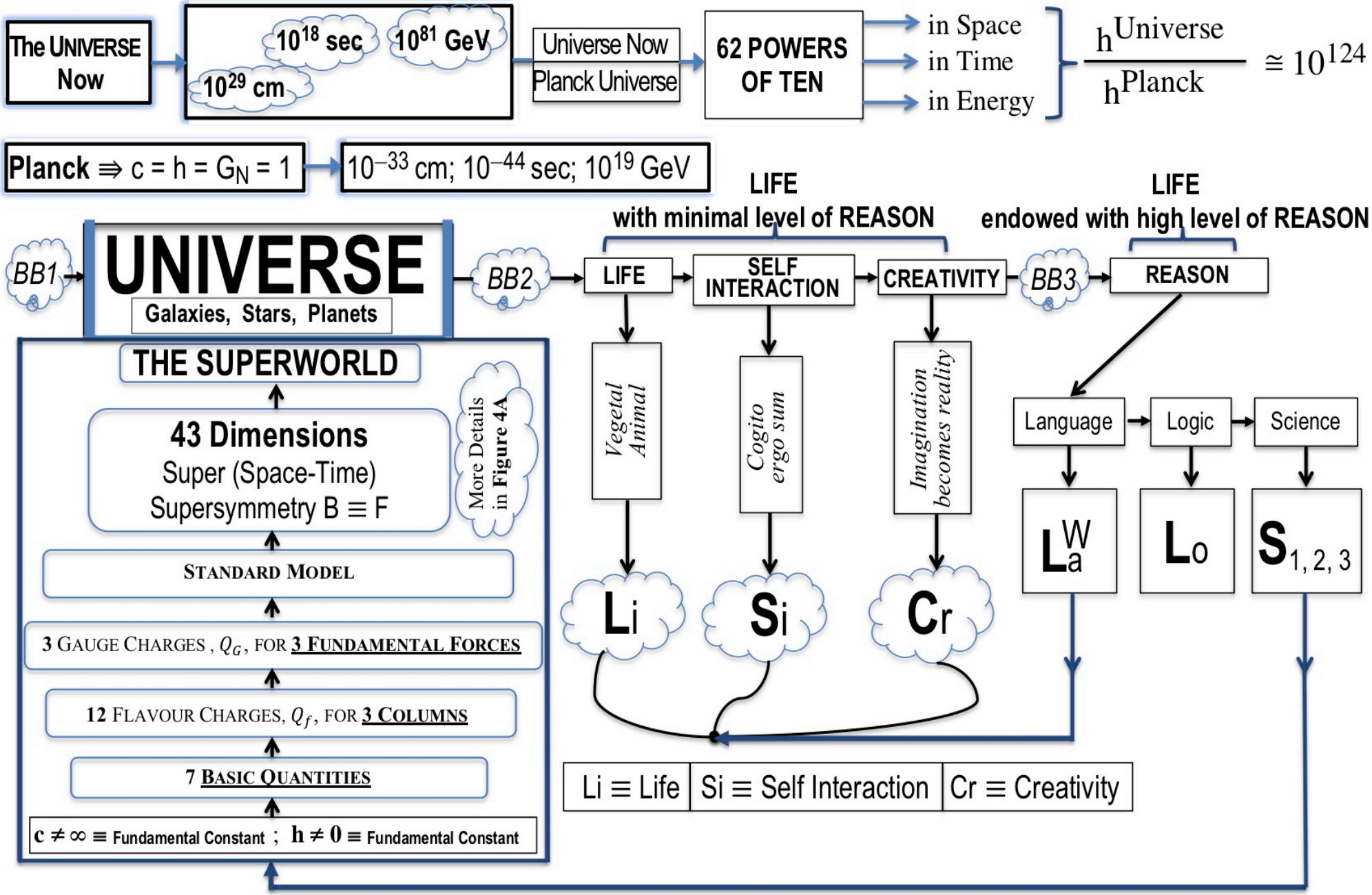
Strong	EM	Weak
$\pi\ p$	$\gamma\ p$	$\nu\ p$
$K\ p$	$e\ p$	
$p\ p$	$\mu\ p$	
$p\ n$	e^+e^-	
$\bar{p}\ p$		

The Future

THE SUPERWORLD

SuperSpace with 43 Dimensions

THE WHOLE OF OUR KNOWLEDGE AND THE THREE BIG BANGS



THE SUPERWORLD

$(9 + 1 + 1) \equiv 11 \equiv B \; ; \quad 32 \equiv F$

Space · Coupling · Time

Bosonic Dimensions: 4 expanded + 7 compactified

Fermionic Dimensions: 32 Dimensions all remain compactified

$43 = Dim$

Total numbers of Dimensions

THE THREE FUNDAMENTAL FORCES

F_{EW}	F_{QCD}	F_G
Electroweak: The force acting between quarks & leptons	Quantum ChromoDynamics: The force acting between quarks & gluons	The Gravitational Force

THREE GAUGE CHARGES, Q_G, FOR THE THREE FUNDAMENTAL FORCES

THREE COLUMNS OF LEPTONS AND QUARKS WITH TWELVE FLAVOUR CHARGES Q_f

$$\begin{pmatrix} \nu_e \\ e^- \end{pmatrix} \; ; \quad \begin{pmatrix} \nu_\mu \\ \mu^- \end{pmatrix} \; ; \quad \begin{pmatrix} \nu_{HL} \\ HL^- \end{pmatrix}$$

1967

τ^- 1975

$$\begin{pmatrix} u \\ d \end{pmatrix} \; ; \quad \begin{pmatrix} c \\ s \end{pmatrix} \; ; \quad \begin{pmatrix} t \\ b \end{pmatrix}$$

TWELVE Q_f FOR THE THREE COLUMNS

s ; t ; m ; E ; $\vec{\sigma}$; Q_G *"Subnuclear Colour" Charges* ; Q_f *"Subnuclear Flavour" Charges*

↑ Space ↑ Time ↑ Mass ↑ Energy ↑ Spin ↑ *(generating the Fundamental Forces)* ↑ *(responsible for the stability of Matter).*

SEVEN BASIC QUANTITIES

$c \neq \infty \equiv$ Fundamental Constant ; $h \neq 0 \equiv$ Fundamental Constant

WE CANNOT REMAIN SILENT

WE SCIENTISTS
CANNOT REMAIN SILENT

when the great public is bombarded with topics such as:

- Complexity is the New Science
- The Reductionism is over. All Sciences must be Holistic
- The Artificial Intelligence will overcome the Human Intelligence
- Chaos is the origin of Life

- The global warming
- The energy crisis
- The information security
- The environment
- The Intelligent Design
- The Evolution
- and other Problems coming from the ‘Whole of Our Knowledge’.

OVERVIEW OF THE 72 PLANETARY EMERGENCIES GROUPED INTO 15 CLASSES

THE 72 PLANETARY EMERGENCIES IDENTIFIED BY THE ERICE SCIENTISTS AND CLASSIFIED INTO 15 BASIC SOURCES		NUMBER OF SOURCES
I	*WATER*	4
II	*SOIL*	3
III	*FOOD*	5
IV	*ENERGY*	5
V	*POLLUTION*	7
VI	*LIMITS OF DEVELOPMENT*	4
VII	*CLIMATIC CHANGES*	5
VIII	*GLOBAL MONITORING OF THE PLANET*	6
IX	*NEW MILITARY THREATS IN THE MULTIPOLAR WORLD*	3
X	*SCIENCE AND TECHNOLOGY FOR DEVELOPING COUNTRIES TO AVOID A NORTH-SOUTH ENVIRONMENTAL HOLOCAUST*	3
XI	*THE PROBLEM OF ORGAN SUBSTITUTION*	5
XII	*MEDICINE, INFECTIOUS AND OTHER DISEASES*	7
XIII	*CULTURAL POLLUTION*	8
XIV	*INFORMATION SECURITY AND COMMON DEFENSE AGAINST COSMIC OBJECTS*	2
XV	*THE HUGE MILITARY INVESTMENTS*	5
	Total	**72**

I *Total: 4*

WATER

① PROTECTION OF NATURAL RESOURCES

② SEARCH FOR NEW SOURCES

③ DESALINIZATION

④ SAVINGS

II *Total: 3*

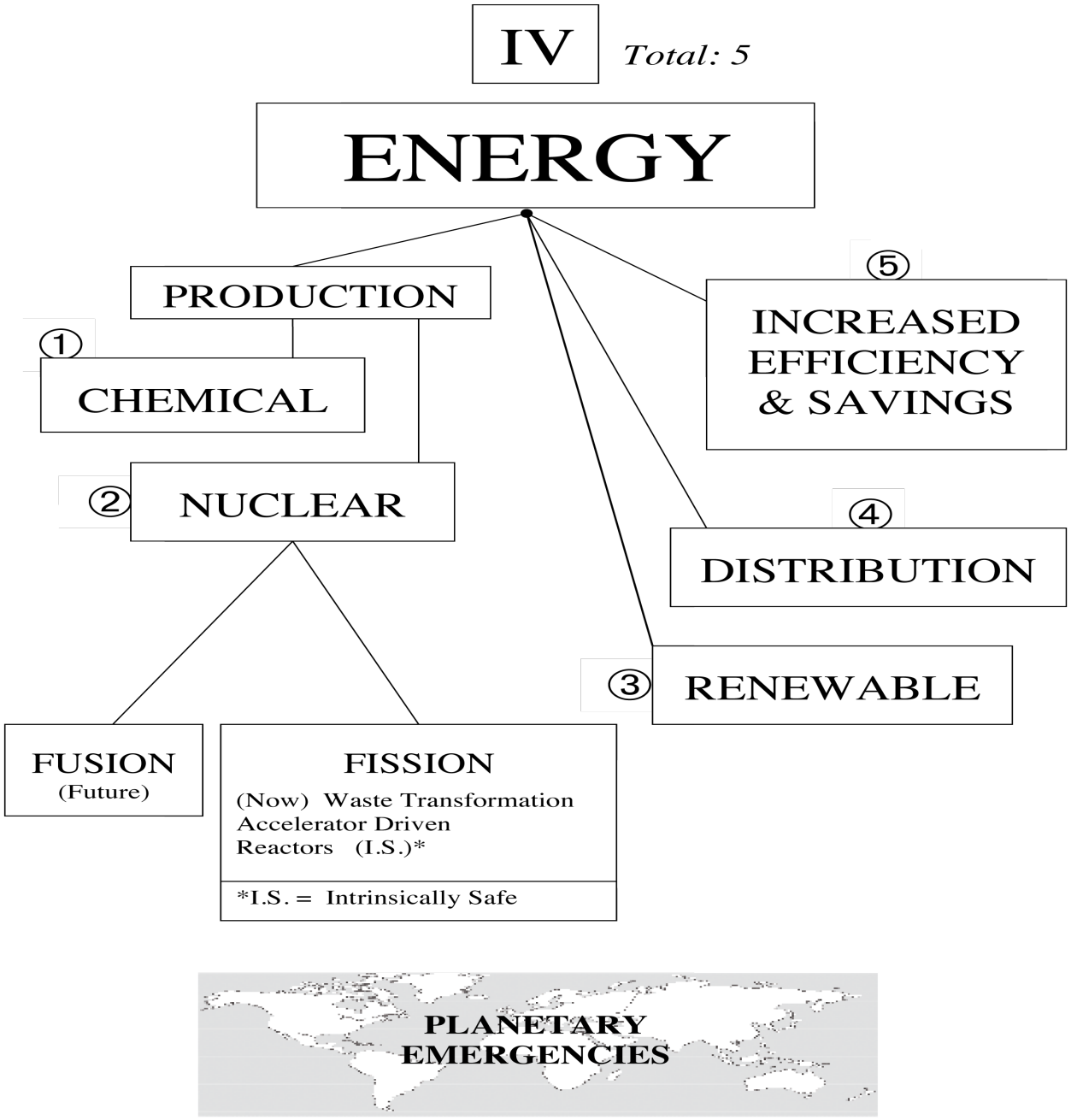
SOIL

① PROTECTION AGAINST POLLUTANTS

② DEFENCE FROM CATASTROPHIC EVENTS

③ DROUGHT AND DESERTIFICATION

III
Total: 5
FOOD
PRODUCTION
①
CLASSICAL AGRICULTURE
②
MARINE AGRICULTURE
③
PROCESSING
④
STORAGE
⑤
NEEDS & WASTE
PLANETARY EMERGENCIES


IV
Total: 5
ENERGY
PRODUCTION
①
CHEMICAL
②
NUCLEAR
FUSION
(Future)
FISSION
(Now) Waste Transformation
Accelerator Driven
Reactors (I.S.)*
*I.S. = Intrinsically Safe
⑤
INCREASED
EFFICIENCY
& SAVINGS
④
DISTRIBUTION
③
RENEWABLE
PLANETARY
EMERGENCIES

V *Total: 7*

POLLUTION

- GLOBAL
  - ① THE CO_2 PROBLEM
  - ② GREENHOUSE EFFECT
  - ③ OZONE DEPLETION
  - ④ ACID RAIN
- LOCAL
  - ⑤ OIL AND CHEMICAL SPILLS
  - ⑥ URBAN AND DOMESTIC
  - ⑦ INDUSTRY

VI *Total: 4*

LIMITS OF DEVELOPMENT

① DEMOGRAPHIC GROWTH

② THE MEGA METROPOLISES AND THE COLLAPSE OF ALL VALUES

③ WATER, SOIL, FOOD, ENERGY

④ UNEMPLOYMENT

VII *Total: 5*

CLIMATIC CHANGES

THE 1ST LEVEL SCIENTIFIC PROBLEMS

① THE MATHEMATICS NEEDED TO SIMULATE THE METEOROLOGICAL MOTOR

② THE EXPERIMENTAL DATA NEEDED IN ORDER TO CHECK THE VALIDITY OF THE PREDICTIONS

THE 2ND LEVEL SCIENTIFIC PROBLEMS (GLOBAL EFFECTS)

③ THE PROBLEM OF UNDERSTANDING THE ORIGIN OF CLOUDS

④ THE EFFECTIVE CONSEQUENCES OF COSMIC RAYS

⑤ THE PROBLEMS OF NOW-CASTING, MEDIUM-RANGE AND GALACTIC-RANGE

VIII *Total: 6*

GLOBAL MONITORING OF THE PLANET

① POLLUTION MONITORING

② ATMOSPHERIC MONITORING

③ DEFENCE AGAINST FLOODS AND OTHER UNEXPECTED EXTREME EVENTS

④ EARTHQUAKES

⑤ VOLCANOES & CALDERA

⑥ DEFENCE AGAINST COSMIC OBJECTS

IX *Total: 3*

NEW MILITARY THREATS IN THE MULTIPOLAR WORLD

① GLOBAL DEFENCE SYSTEM

② DANGER OF PROLIFERATION OF WMD*

③ TERRORISM

*WMD = Weapons of Mass Destruction

X *Total: 3*

SCIENCE AND TECHNOLOGY FOR DEVELOPING COUNTRIES TO AVOID A NORTH-SOUTH ENVIRONMENTAL HOLOCAUST

① THE NATIONAL SCHOLARSHIP PROJECT

② SCIENCE WITHOUT SECRETS AND THE PROBLEM OF TECHNOLOGICAL DEVELOPMENTS PRO AND AGAINST MANKIND

③ THE ROLE OF BIG SCIENTIFIC RESEARCH CENTERS USING INERT MATTER AND LIVING MATTER

XI *Total: 5*

THE PROBLEM OF ORGAN SUBSTITUTION

① ARTIFICIAL ORGANS

② NATURAL ORGANS

③ THE UNDERSTANDING OF "MINIMAL LIFE"

④ FROM INERT TO LIVING MATTER

⑤ THE CONTRIBUTION COMING FROM GENETIC ENGINEERING

XII *Total: 7*

MEDICINE, INFECTIOUS AND OTHER DISEASES

① AIDS

② OTHER PATHOLOGIES (EBOLA*)

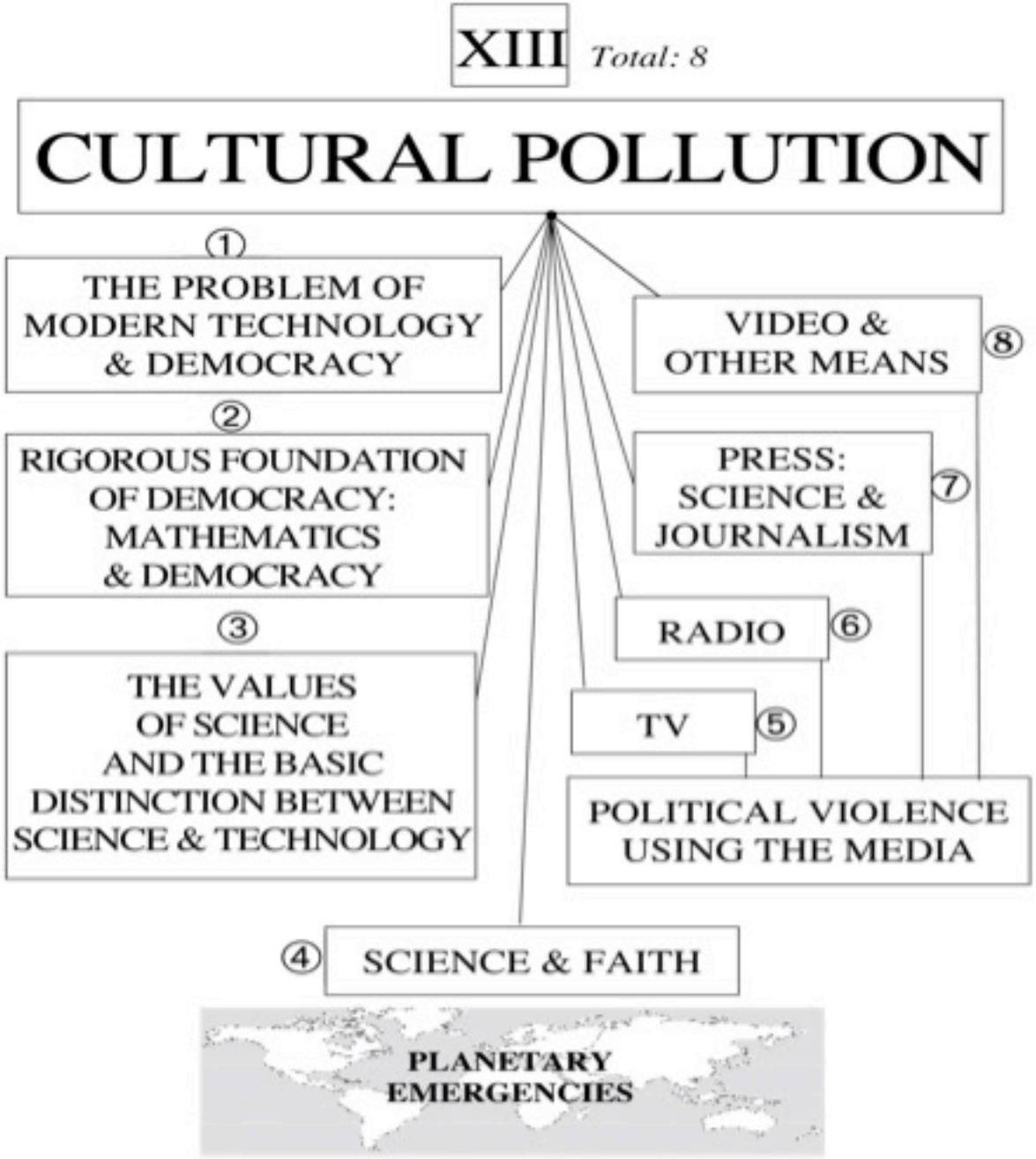
③ INFECTIONS DUE TO STANDARD MEDICAL CARE

④ IN THE FIELD (EBOLA*)

⑤ IN THE LABORATORY (EBOLA*)

⑥ NEUROPATHOLOGICAL SOURCES

⑦ BIOTECHNOLOGICAL SOURCES


XIII Total: 8
CULTURAL POLLUTION
①
THE PROBLEM OF MODERN TECHNOLOGY & DEMOCRACY
②
RIGOROUS FOUNDATION OF DEMOCRACY: MATHEMATICS & DEMOCRACY
③
THE VALUES OF SCIENCE AND THE BASIC DISTINCTION BETWEEN SCIENCE & TECHNOLOGY
④ SCIENCE & FAITH
VIDEO & OTHER MEANS ⑧
PRESS: SCIENCE & JOURNALISM ⑦
RADIO ⑥
TV ⑤
POLITICAL VIOLENCE USING THE MEDIA
PLANETARY EMERGENCIES

XIV *Total: 2*

COMMON DEFENSE AGAINST COSMIC OBJECTS

① DETECTION

② DEFENSE

METEORITES AND COMETS

WITHOUT MEMORY THERE IS
NEITHER SCIENCE NOR CIVILIZATION

DINOSAUR
EXTINCTION
65 MILLION YEARS
AGO (10^9 MT)

ARIZONA
15MT (F_e) -
50,000 YEARS AGO

SIBERIA
10MT (H_2O) - 1908

XV *Total: 5*

THE HUGE MILITARY INVESTMENTS

① DISMANTLING OF THE 60,000 NUCLEAR WARHEADS

② DESTRUCTION OF CHEMICAL WEAPONS

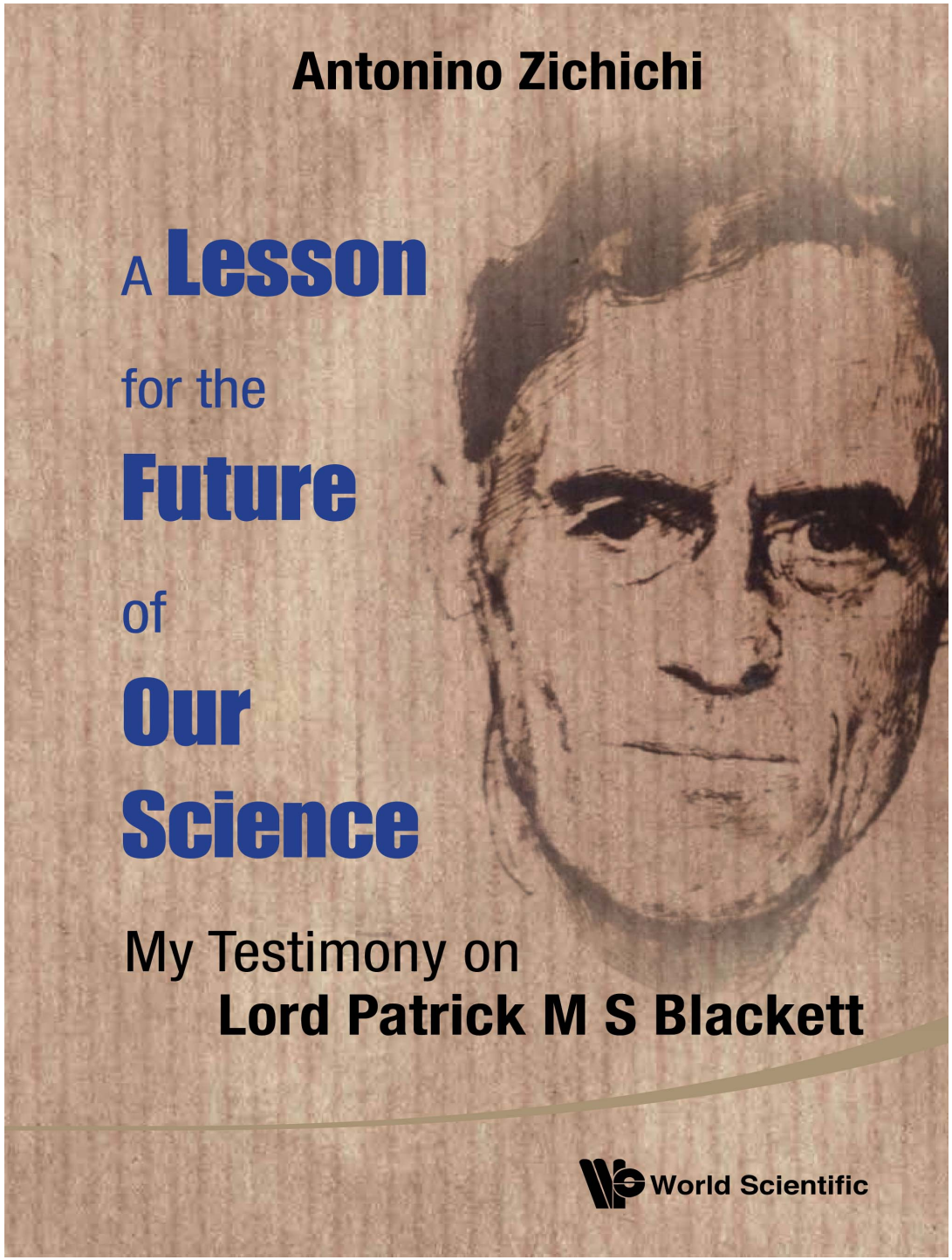
③ RECONVERSION OF WAR INDUSTRIES

④ NEW INITIATIVES TO CHANNEL MILITARY RESOURCES TOWARDS PROJECTS FOR PEACE

⑤ THE NEW ARMS RACE FOR HIGH PRECISION WEAPONS

UEEC IN HISTORY AND IN SCIENCE

	In History ≡ EWRL		In Science ≡ EBUS
I	What if Julius Caesar had been assassinated many years before?	*I*	What if Galileo Galilei had not discovered that $F = mg$?
II	What if Charles VII had not been able to win the 100 years war?	*II*	What if Newton had not discovered that $F = G\frac{m_1 \cdot m_2}{R_{12}^2}$?
III	What if America had been discovered a few centuries later?	*III*	What if Maxwell had not discovered the unification of electricity, magnetism and optical phenomena, which allowed him to conclude that light is a vibration of the EM field?
IV	What if Napoleon had not been born?	*IV*	What if Becquerel had not discovered radioactivity?
V	What if Louis XVI had been able to win against the 'Storming of the Bastille'?	*V*	What if Planck had not discovered that $h \neq 0$?
VI	What if the 1908 Tunguska Comet had fallen somewhere in Europe instead of Tunguska in Siberia?	*VI*	What if Lorentz had not discovered that space and time cannot both be real?
VII	What if the killer of the Austrian Archduke Franz Ferdinand had been arrested the day before the Sarajevo event?	*VII*	What if Einstein had not discovered the existence of time-like and space-like real worlds? Only in the time-like world, simultaneity does not change, with changing observer.
VIII	What if Lenin had been killed during his travelling through Germany?	*VIII*	What if Rutherford had not discovered the nucleus?
IX	What if Hitler had not been appointed Chancellor by the President of the Republic of Weimar Paul von Hindenburg?	*IX*	What if Hess had not discovered cosmic rays?
X	What if Pyotr Kapitza accepted to be the leader of the USSR H-bomb Project as wanted by Stalin?	*X*	What if Dirac had not discovered his equation, which opens new horizons, including the existence of the antiworld?
XI	What if Nazi Germany had defeated the Soviet Union?	*XI*	What if Fermi had not discovered weak forces?
XII	What if Karol Wojtyla had not been elected Pope, thus becoming John Paul II?	*XII*	What if Fermi and Dirac had not discovered the Fermi–Dirac statistics?
XIII	What if Gorbachev had not been defeated by Yeltsin?	*XIII*	What if Yukawa had not proposed the existence of a "meson" in order to have the nuclear glue?
XIV	What if the USSR had not collapsed?	*XIV*	What if the 'strange particles' had not been discovered in the Blackett Lab?


Antonino Zichichi
A Lesson
for the
Future
of
Our
Science
My Testimony on
Lord Patrick M S Blackett
World Scientific

References

[1] M. Planck, Sitzungsber. Preuss. Akad. Wiss. 5, 440 (1899); the problem of the Fundamental Units of Nature was also presented by M. Planck in a series of lectures he delivered in Berlin (1906) and published as *Theorie der Wärmestrahlung* (Barth, Leipzig, 1906) the English translation is *The Theory of Heat Radiation* (trans. M. Masius, Dover, New York, 1959).

[2] K. Schwarzschild, Sitzungsber. K. Preuss. Akad. Wiss. **7**, 189 (1916).