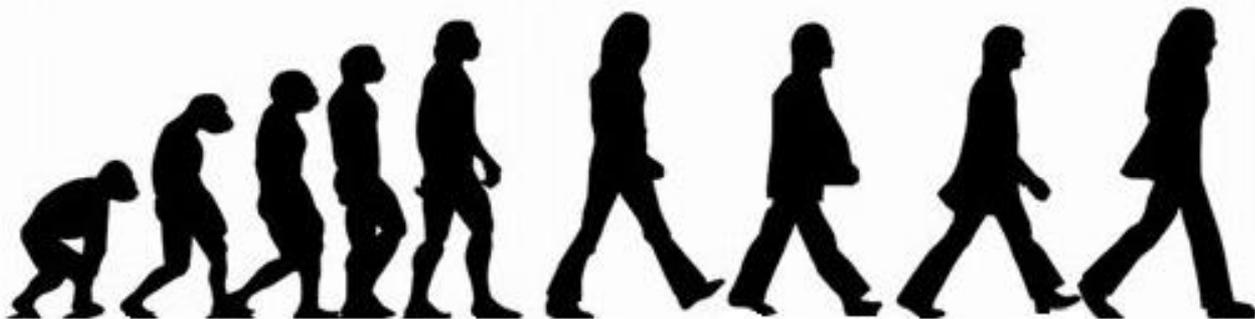


All you need is ...
method!

Matteo Mascolo - Open Day LNF - 2014



Chi è “lo scienziato” ? **NON LUI.**

“

Dicono che nel mio sangue
ci siano i leucociti, e nella
mia carne sodio e carbonio.

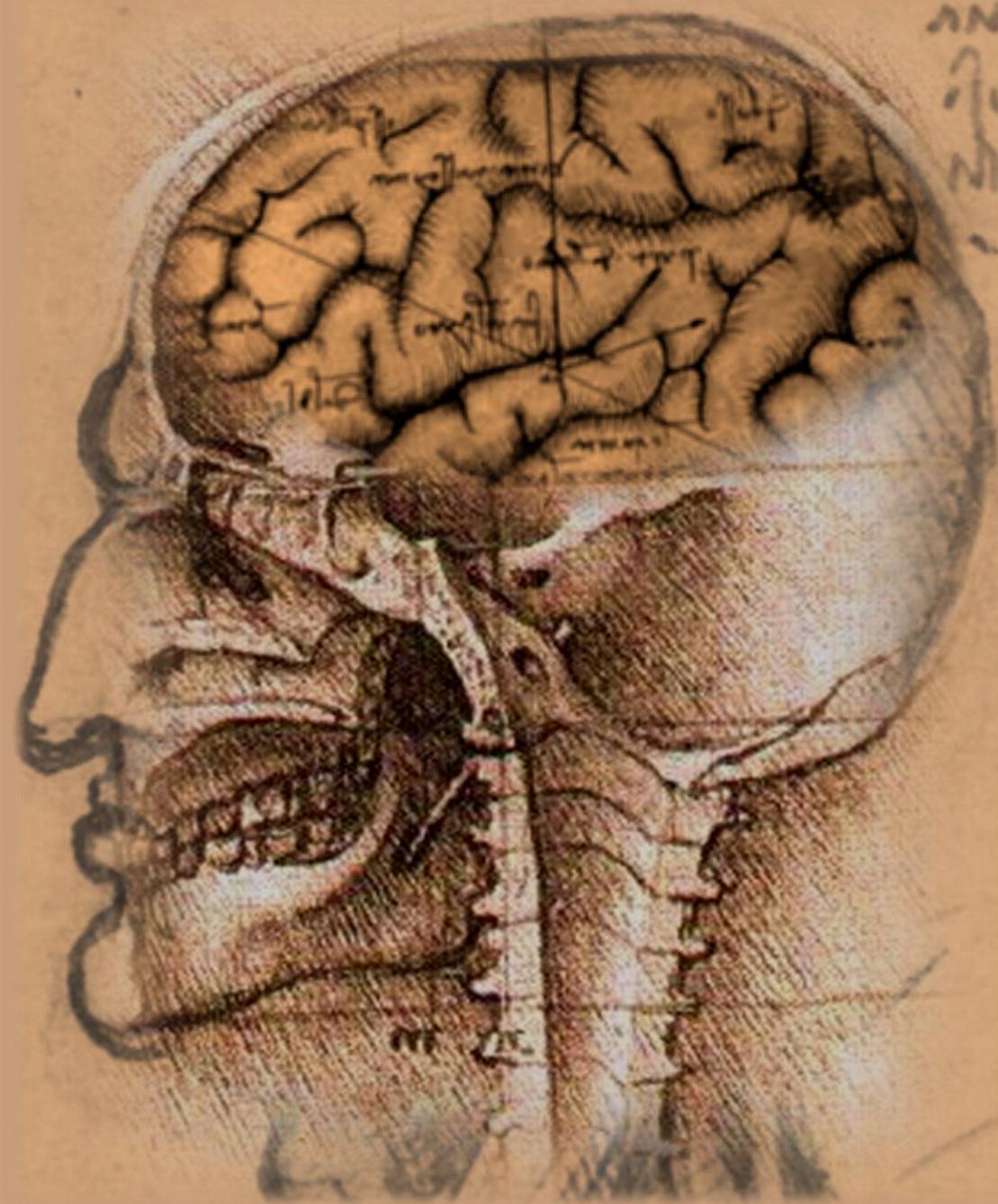
Li ringrazio
dell'informazione e dico
loro che ci sono scarafaggi
nella mia cucina, della soda
in lavanderia e persino del
carbone in cantina.

Non nego certo la loro
esistenza, ma li tengo al loro
posto e mi basta ...

”



George Bernard Shaw (1856-1950)
Scrittore e drammaturgo irlandese

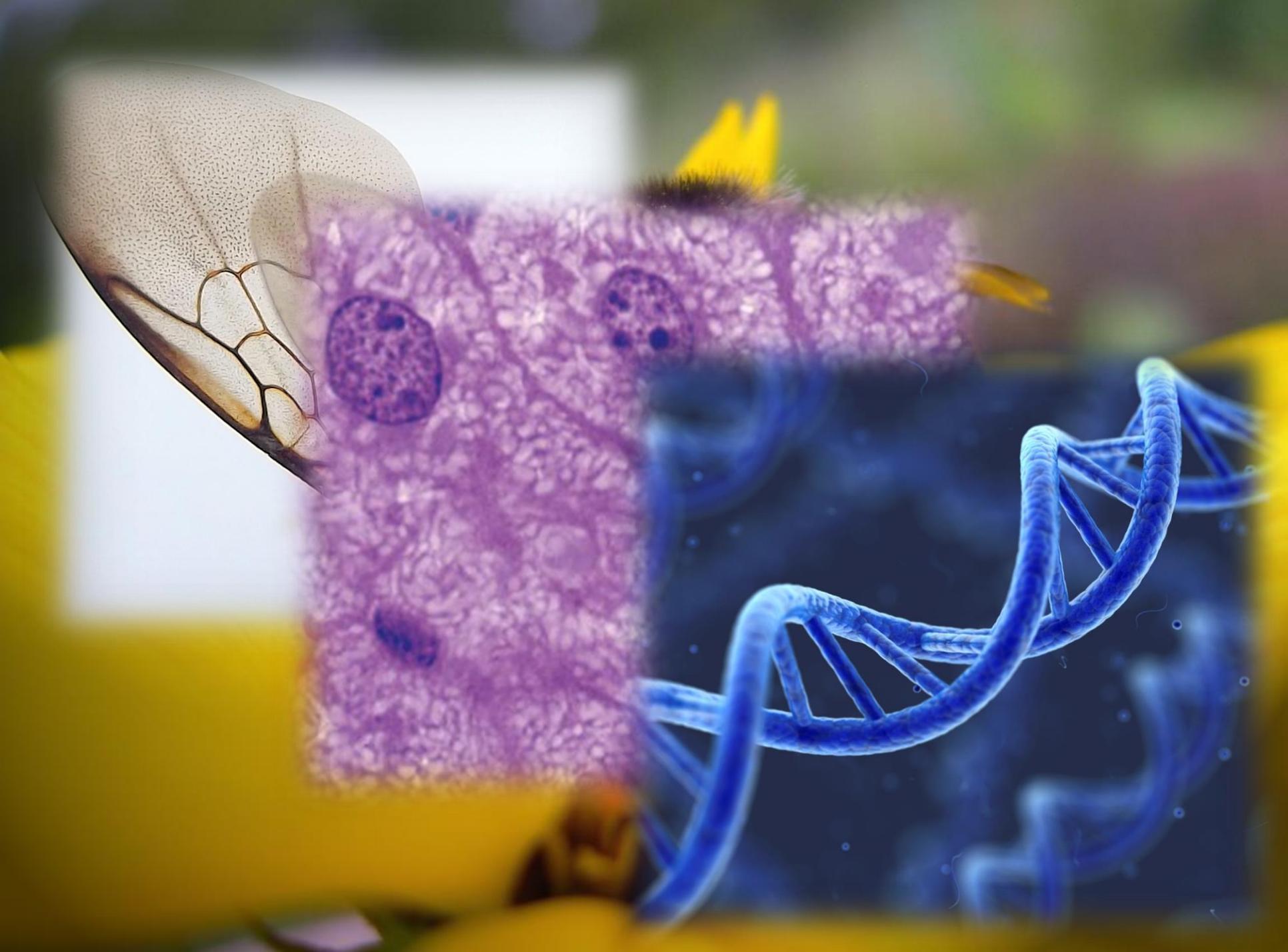


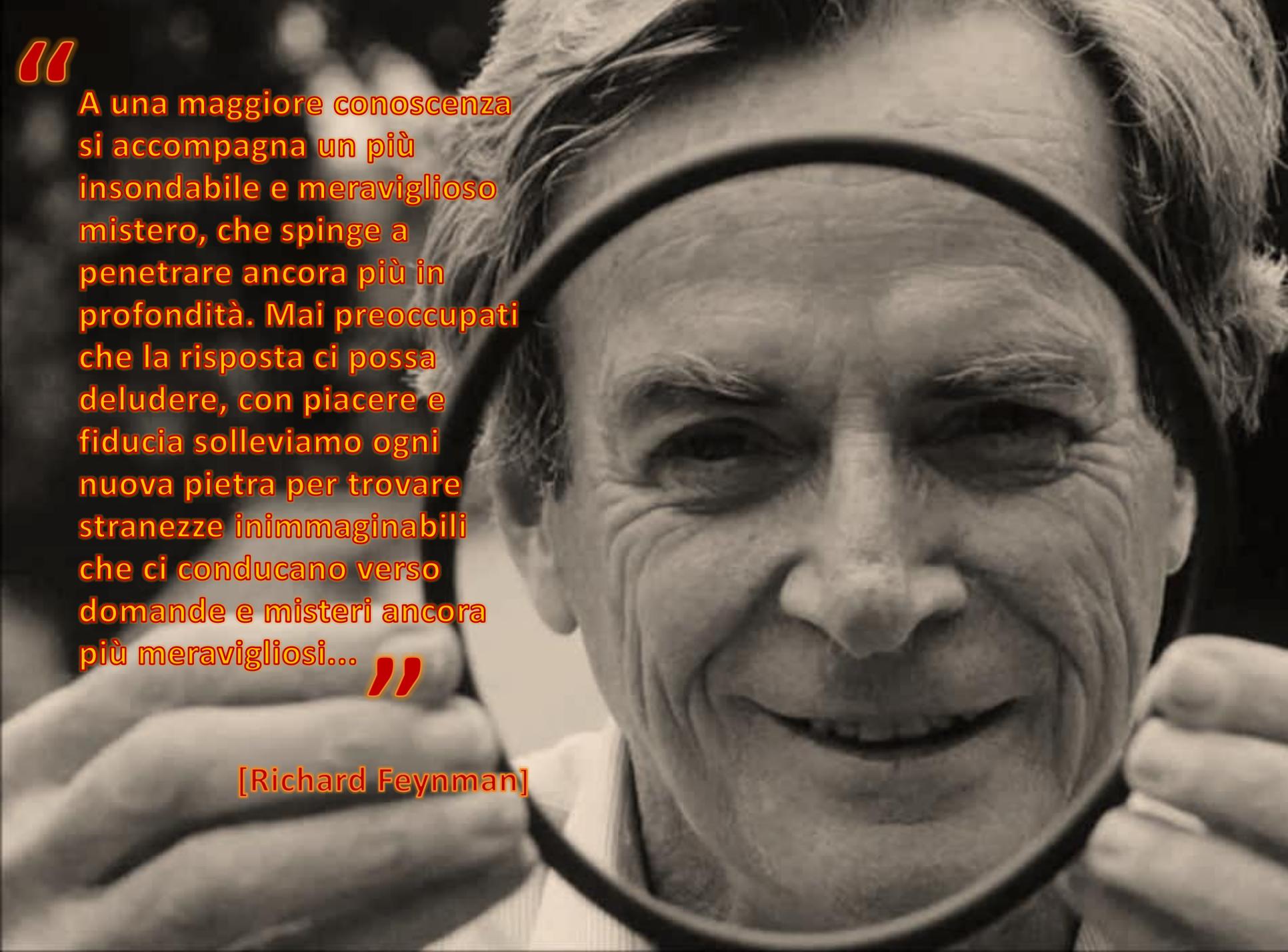
ANV
100
101

PL. 25







A black and white close-up photograph of an elderly man, Richard Feynman, looking through a magnifying glass. He has a slight smile and his eyes are focused through the lens. The background is dark and out of focus.

“ A una maggiore conoscenza si accompagna un più insondabile e meraviglioso mistero, che spinge a penetrare ancora più in profondità. Mai preoccupati che la risposta ci possa deludere, con piacere e fiducia solleviamo ogni nuova pietra per trovare stranezze inimmaginabili che ci conducano verso domande e misteri ancora più meravigliosi... ”

[Richard Feynman]



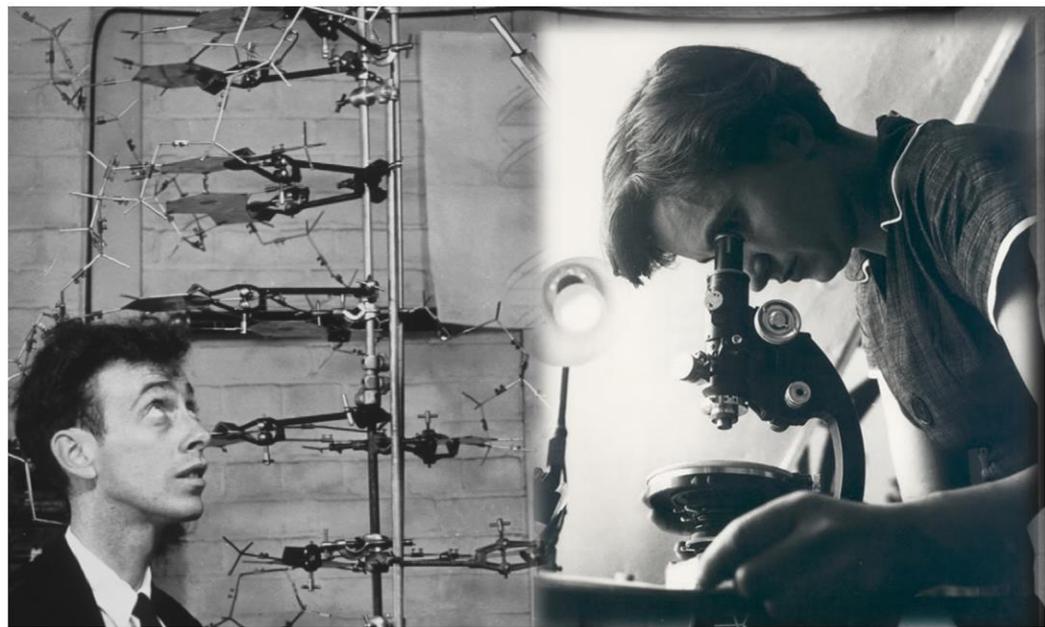
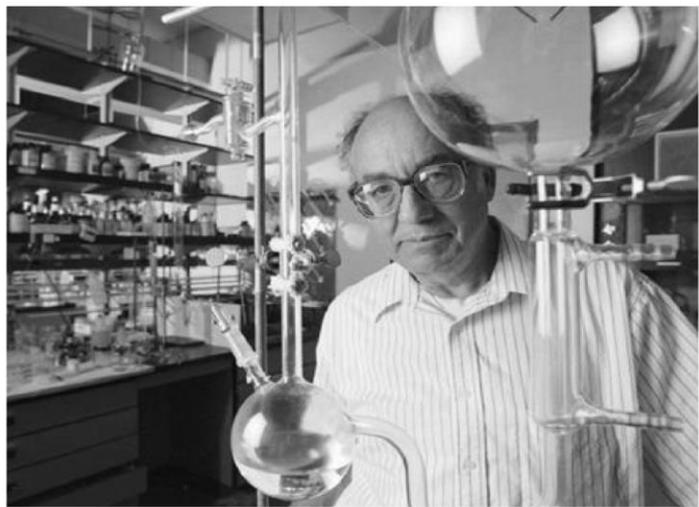
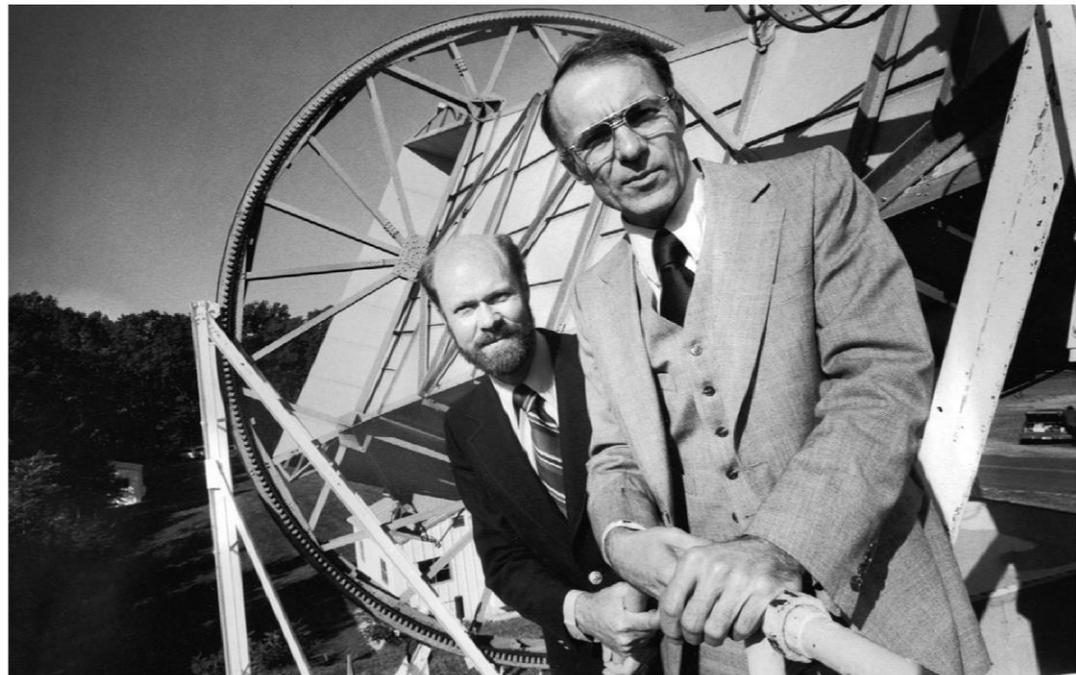
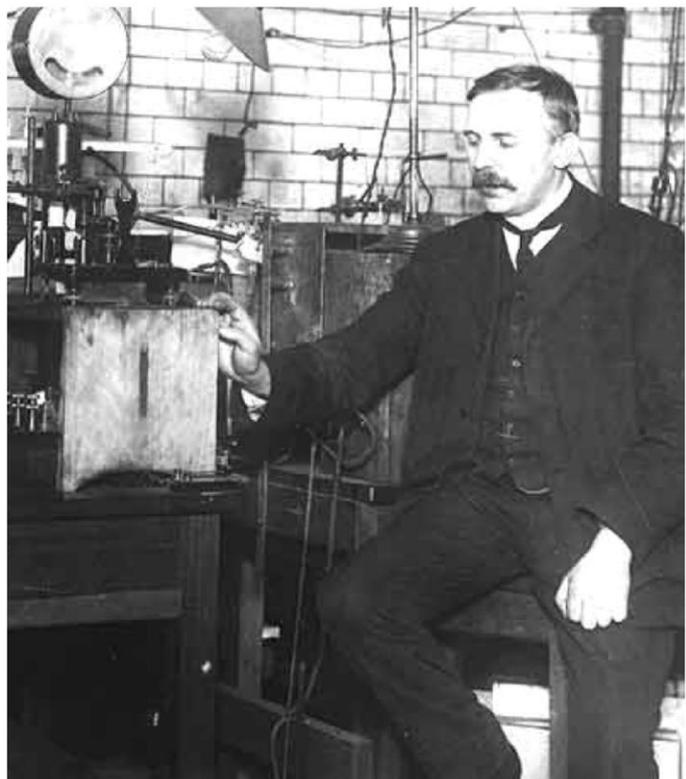
Scienze

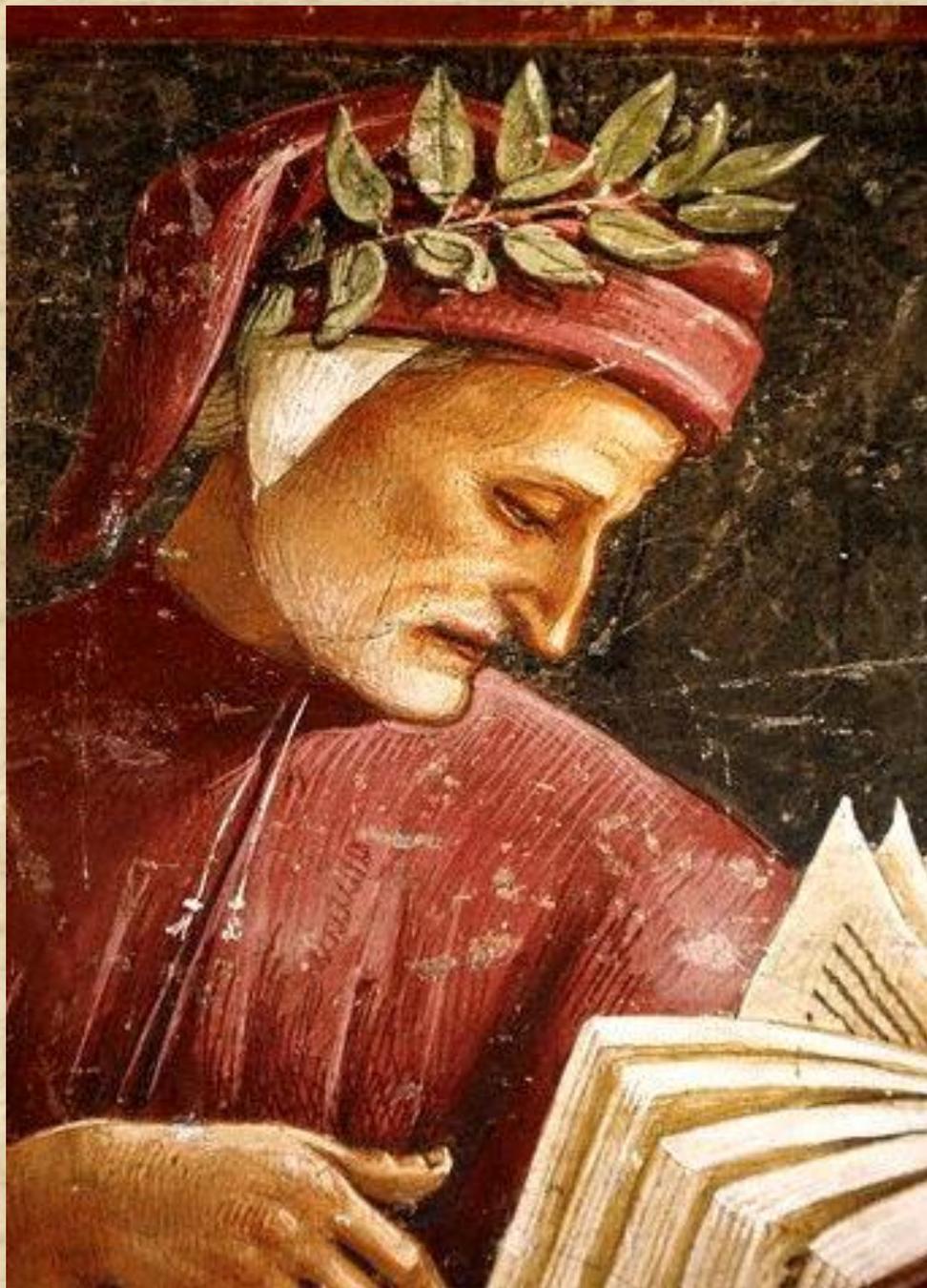
BIOLOGIA

CHIMICA

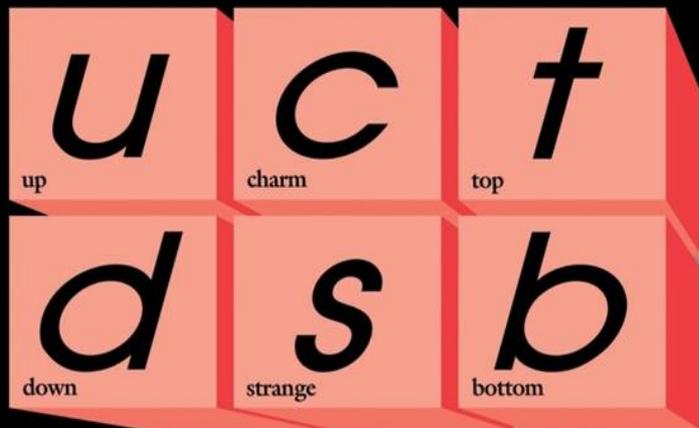
GEOLOGIA

FISICA

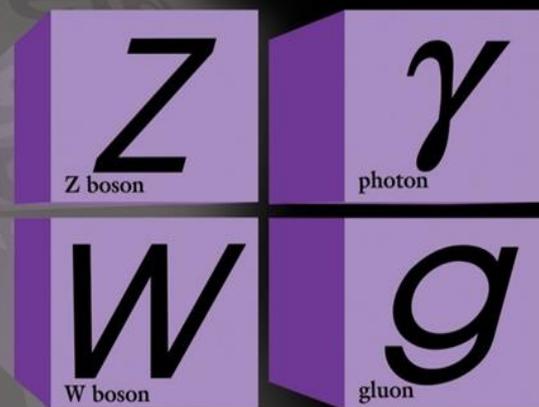




Quarks



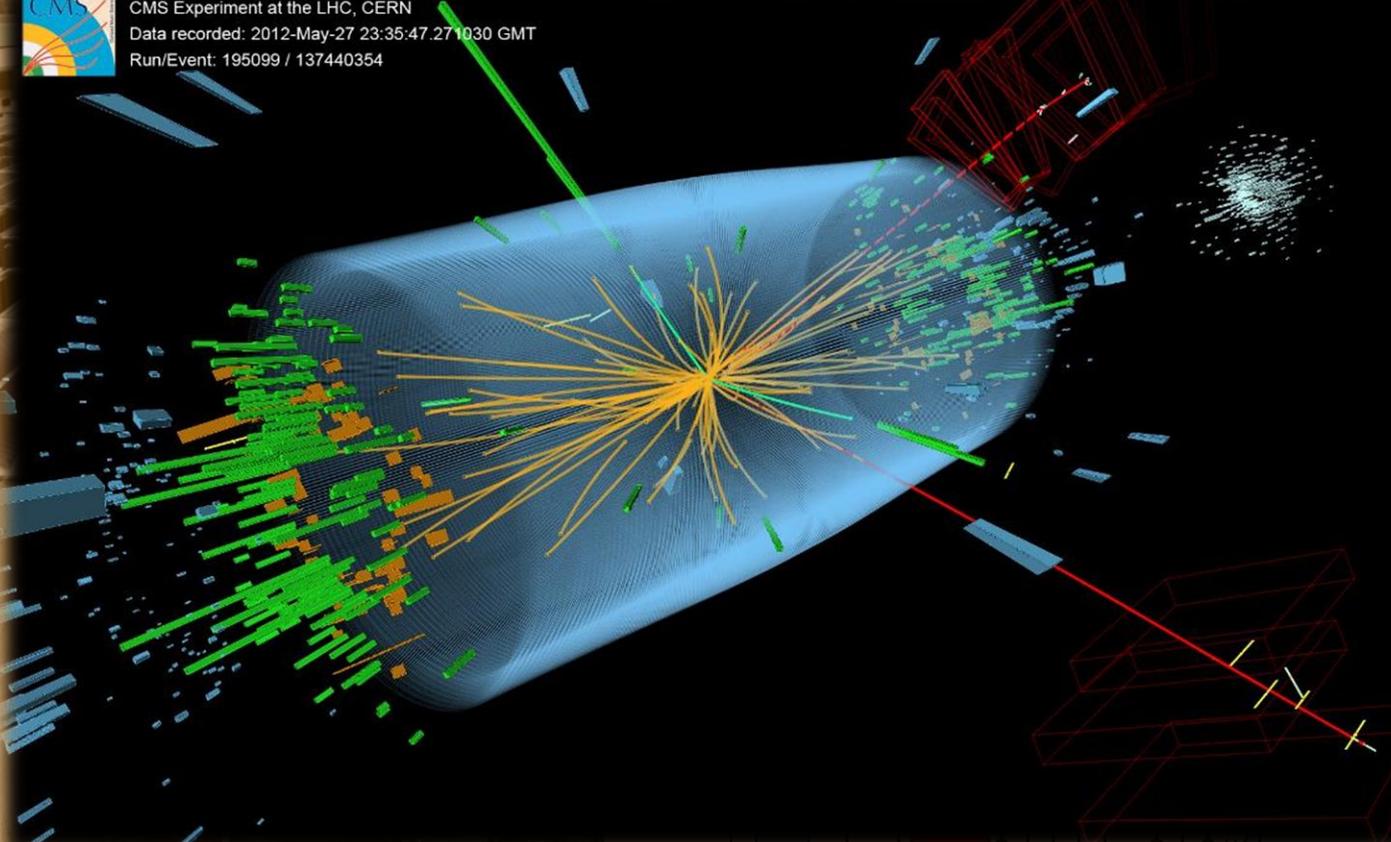
Forces



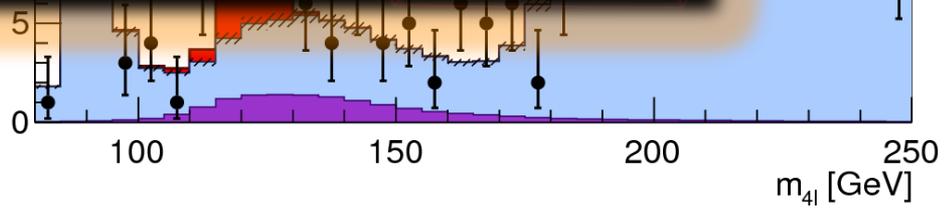
Leptons



CMS Experiment at the LHC, CERN
Data recorded: 2012-May-27 23:35:47.271030 GMT
Run/Event: 195099 / 137440354



$\int dt = 4.6 \text{ fb}^{-1}$
 $\int dt = 20.7 \text{ fb}^{-1}$





Física



- Moto dei corpi





- Moto dei corpi
- Luce



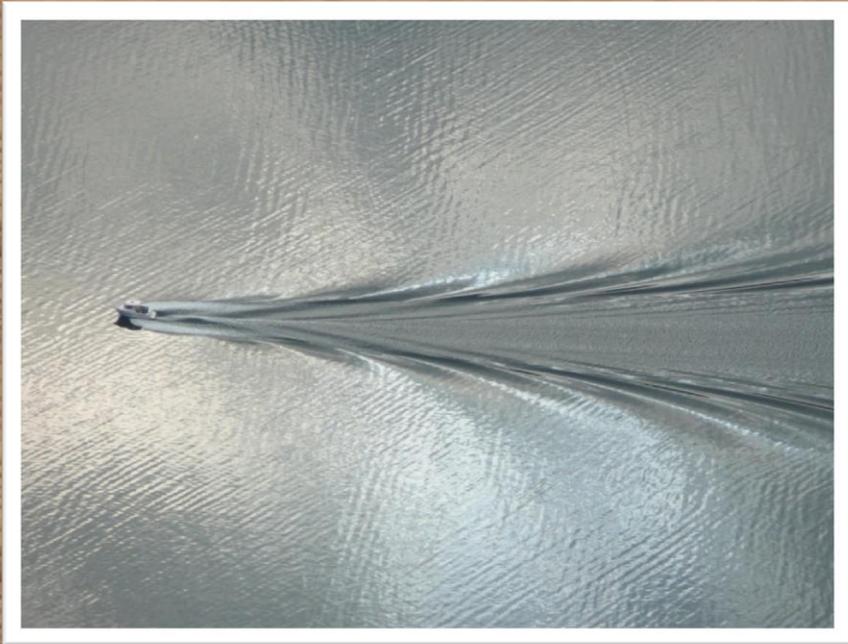


- Moto dei corpi
- Luce
- Suono





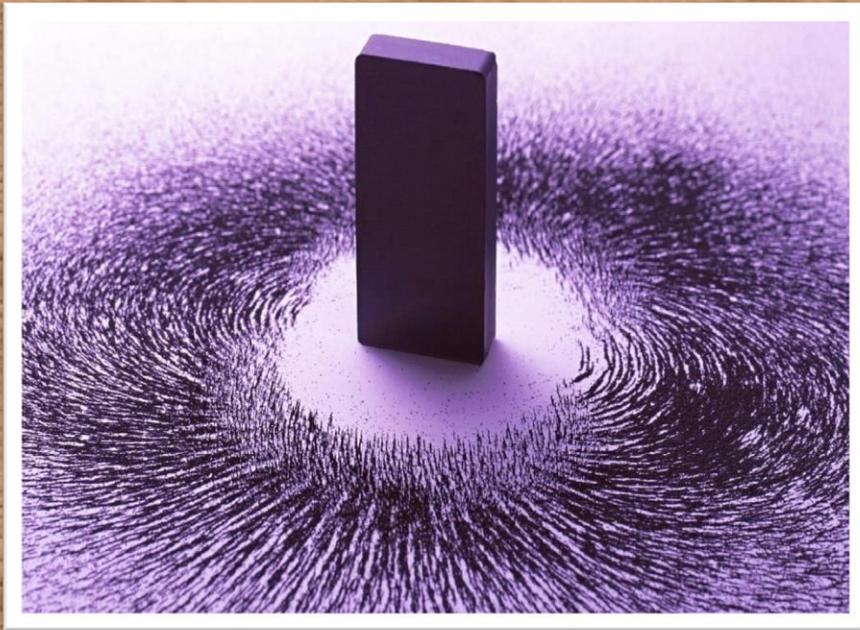
- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori





- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità





- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo

Fisica

- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore



Fisica

- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore
- Gravità



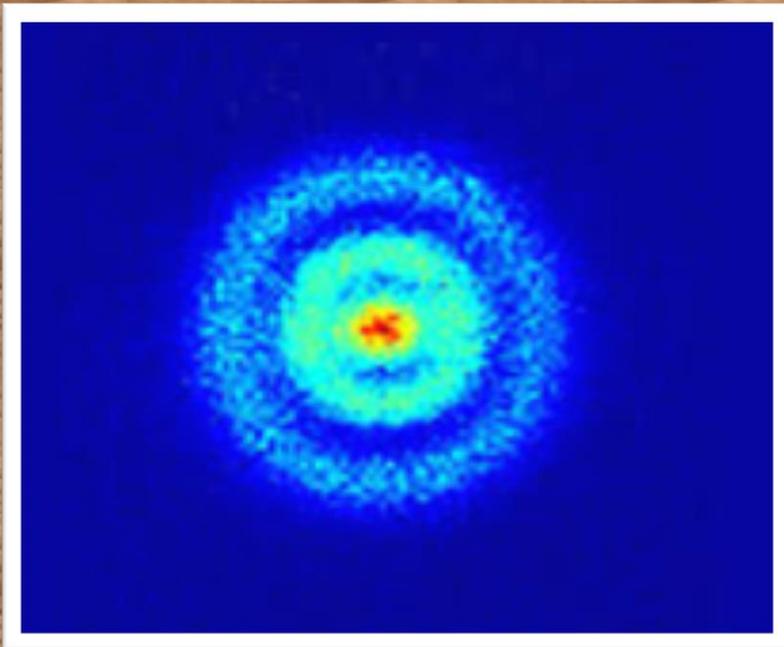
Fisica



- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore
- Gravità
- Universo (pianeti, stelle, galassie, buchi neri e "altro")

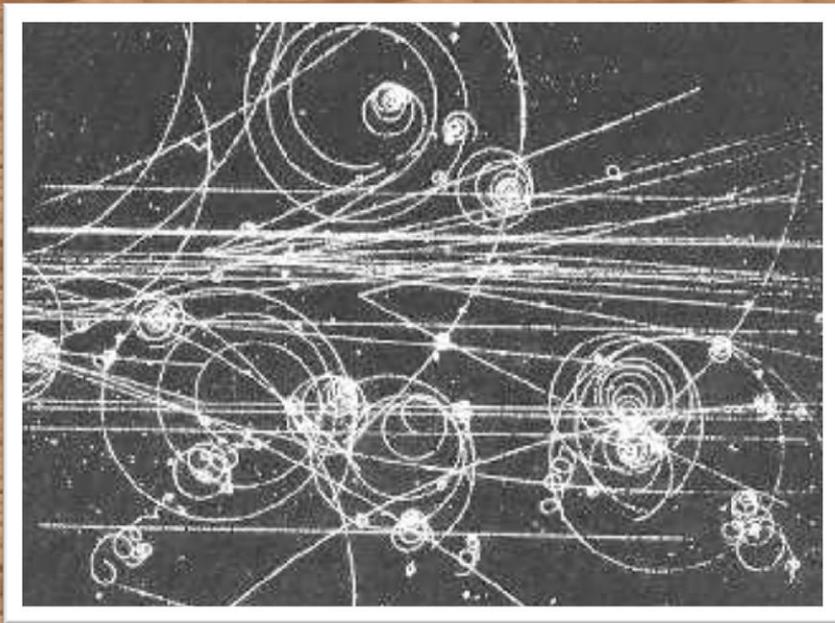


Fisica



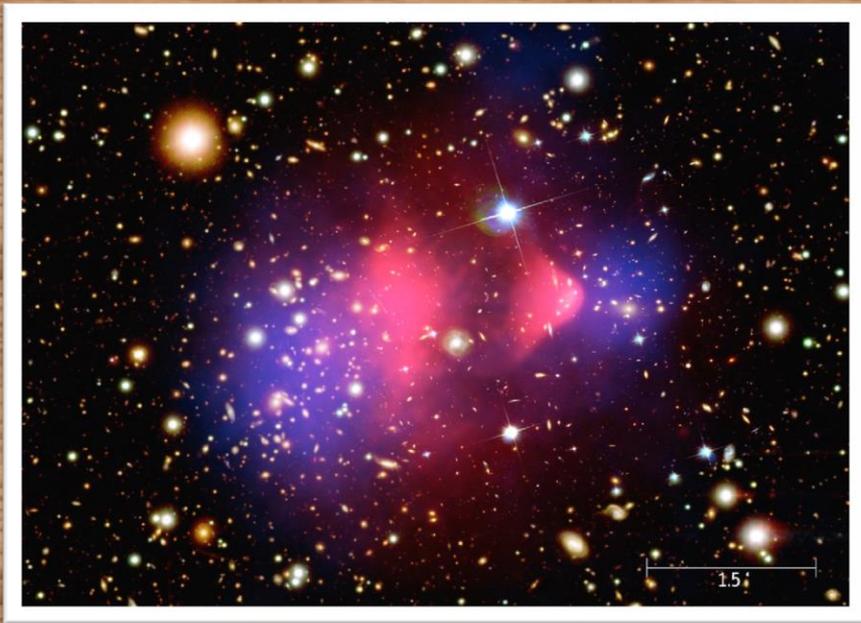
- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore
- Gravità
- Universo (pianeti, stelle, galassie, buchi neri e "altro")
- Atomi

Fisica



- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore
- Gravità
- Universo (pianeti, stelle, galassie, buchi neri e "altro")
- Atomi
- Particelle elementari

Fisica



- Moto dei corpi
- Luce
- Suono
- Fenomeni ondulatori
- Elettricità
- Magnetismo
- Calore
- Gravità
- Universo (pianeti, stelle, galassie, buchi neri e "altro")
- Atomi
- Particelle elementari
- Materia/energia "oscure"

Quando nasce la Fisica?

moderna



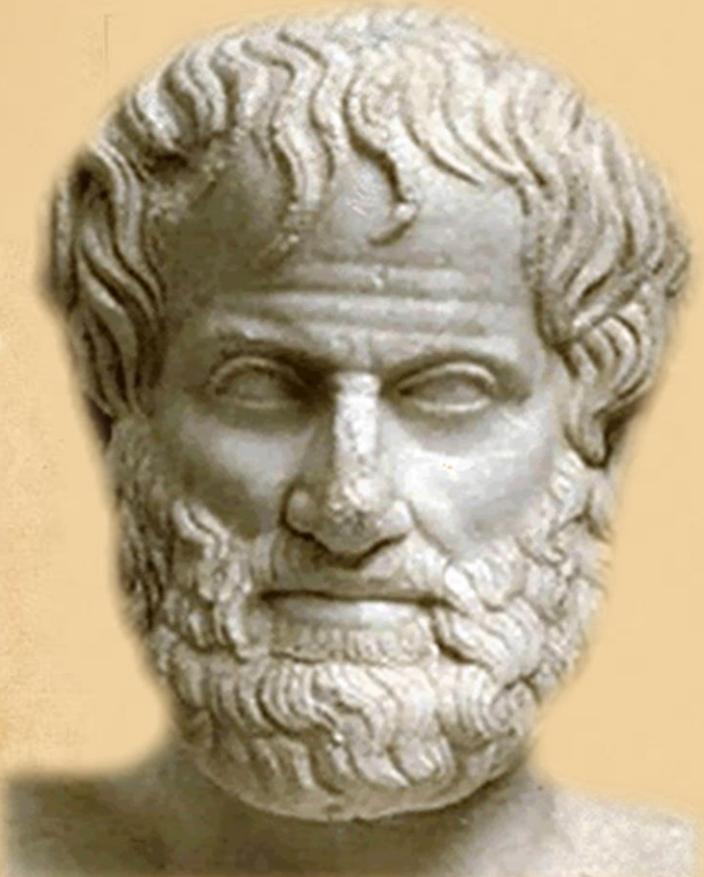


Galileo Galilei (1564-1642)

Una rivoluzione scientifica



Il sapere scientifico all'inizio del 1600...



ARISTOTELE

IPSE
DIXIT

“Il pensiero aristotelico non va interpretato ma accettato, perché l’ha detto lui”

[Avveroè]

“SENSATE ESPERIENZE”
(le intuizioni)



“NECESSARIE DIMOSTRAZIONI”
(gli esperimenti)

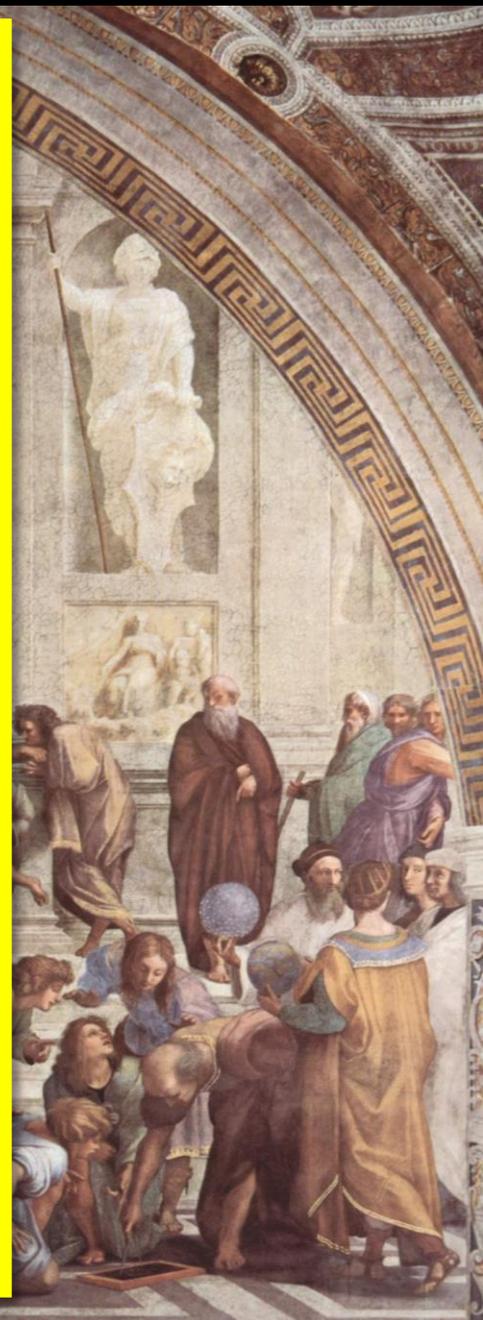


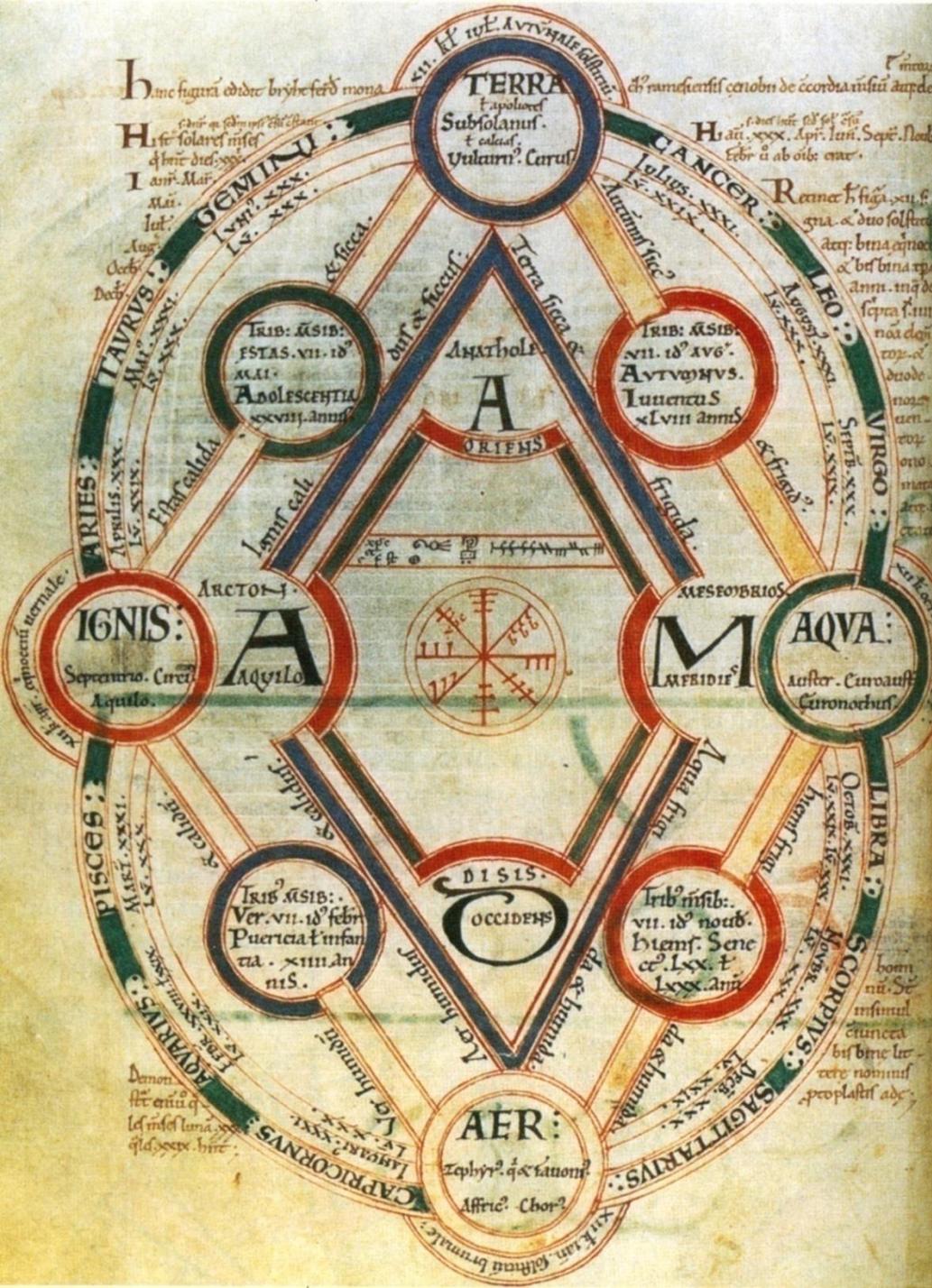
“

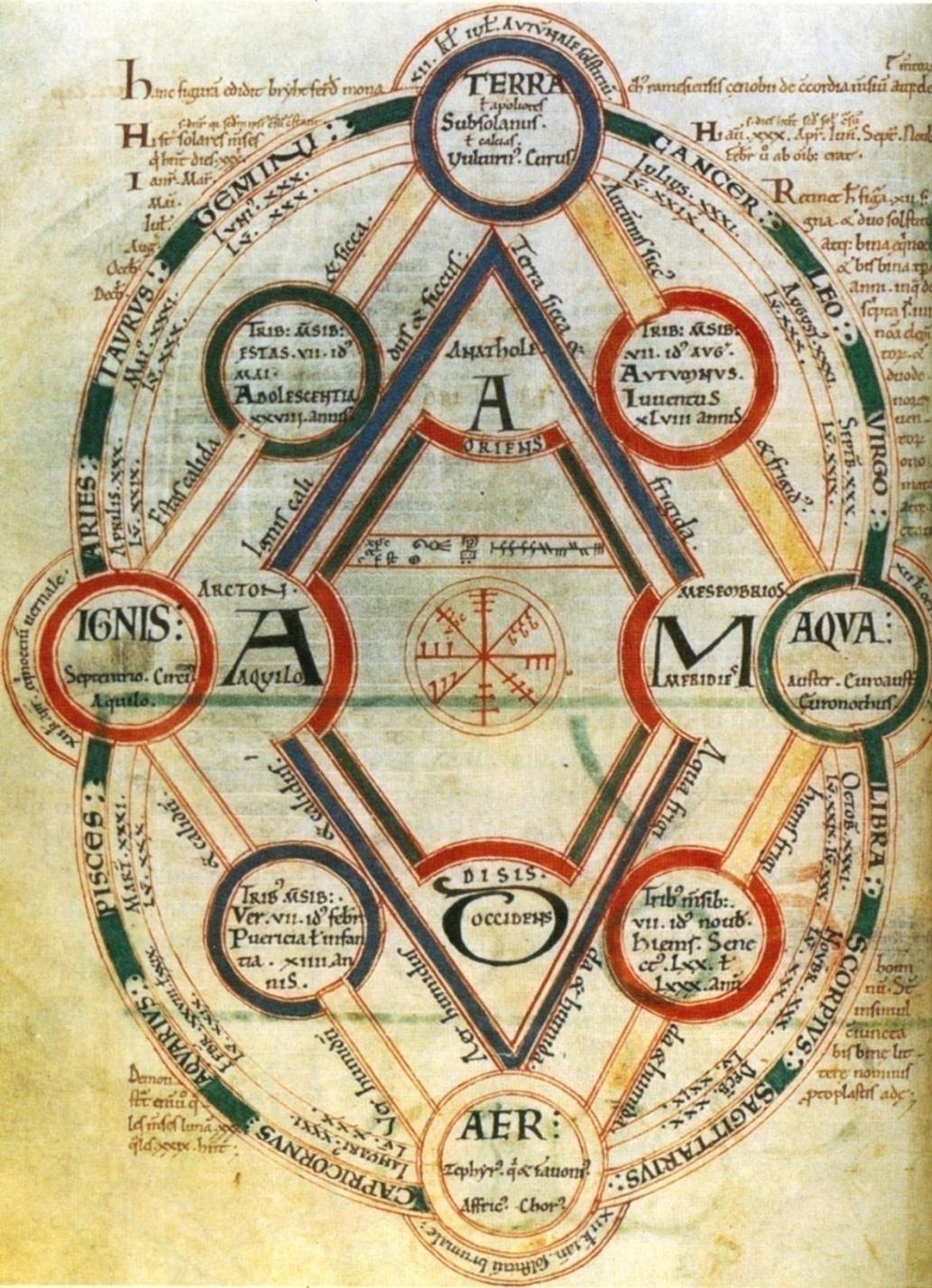
Ma nelle scienze naturali, le conclusioni delle quali sono vere e necessarie, né vi ha che far nulla l'arbitrio umano, bisogna guardarsi di non si porre alla difesa del falso, perché mille Demosteni e Aristoteli resterebbero a piede contro ad ogni mediocre ingegno che abbia avuto ventura di apprendersi al vero

”

[Galileo Galilei]



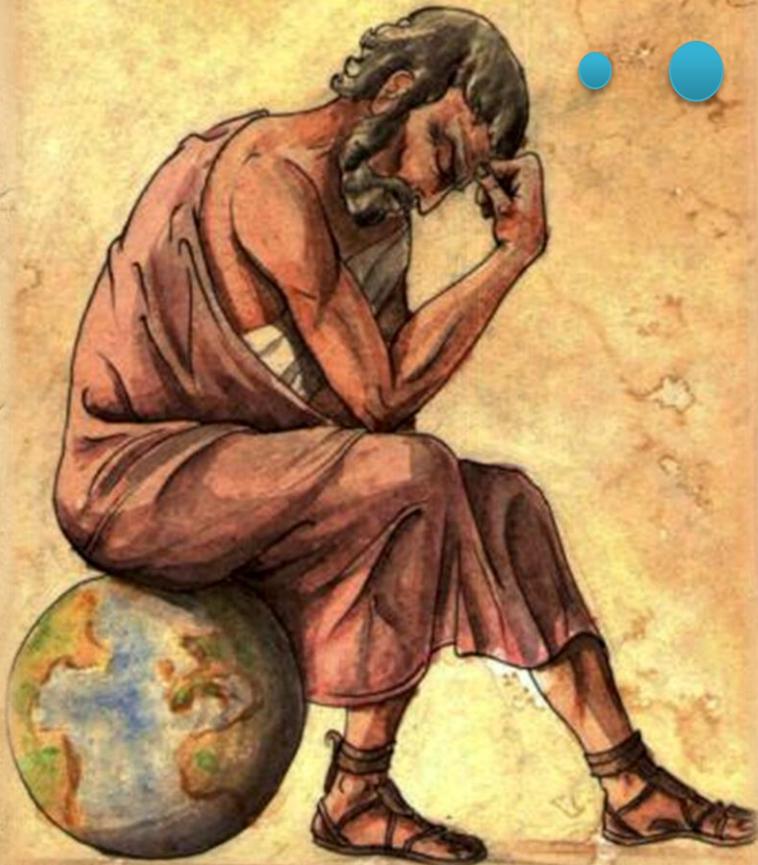




Il sapere scientifico all'inizio del 1600...

Aristotele

384 a. C.

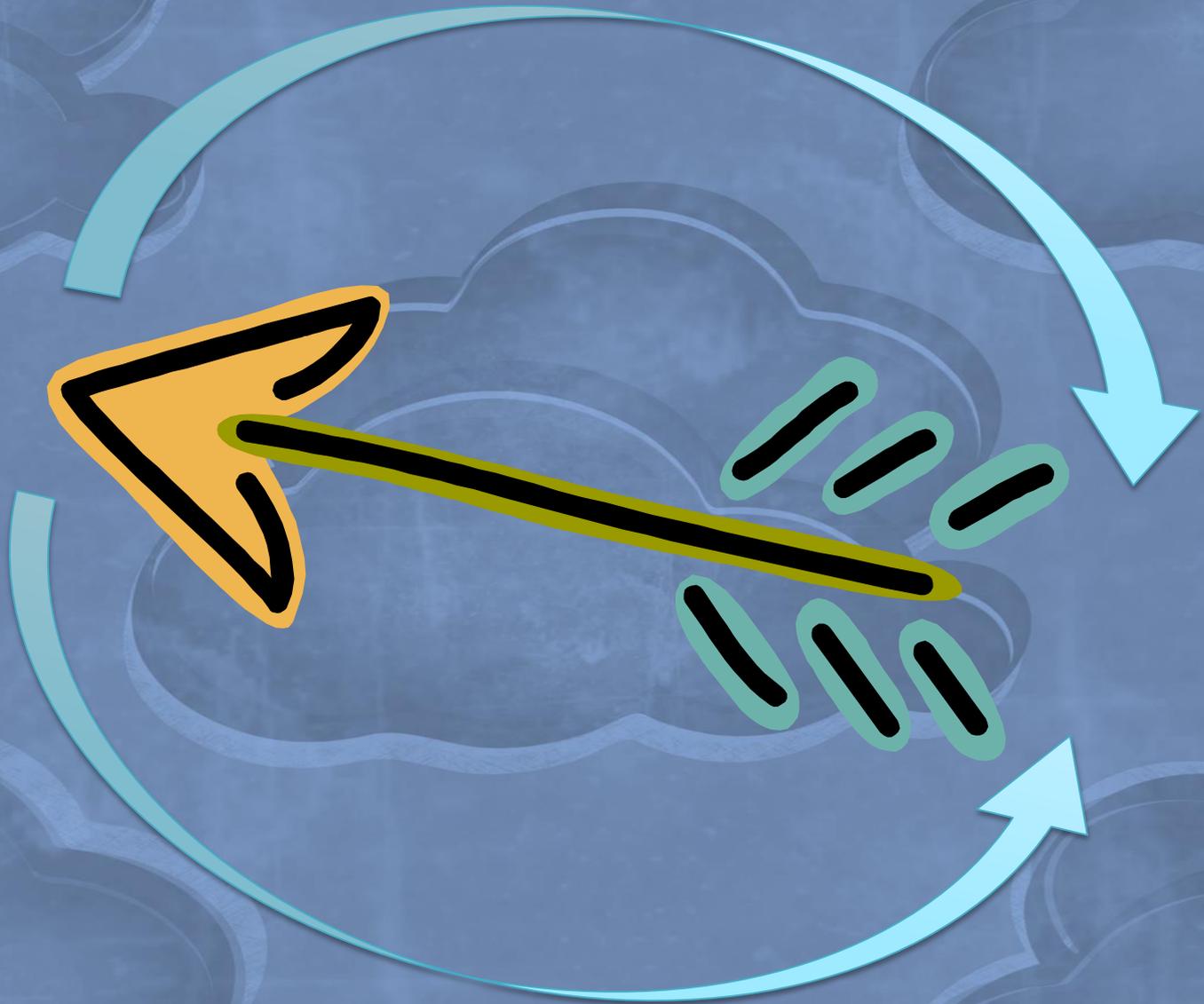


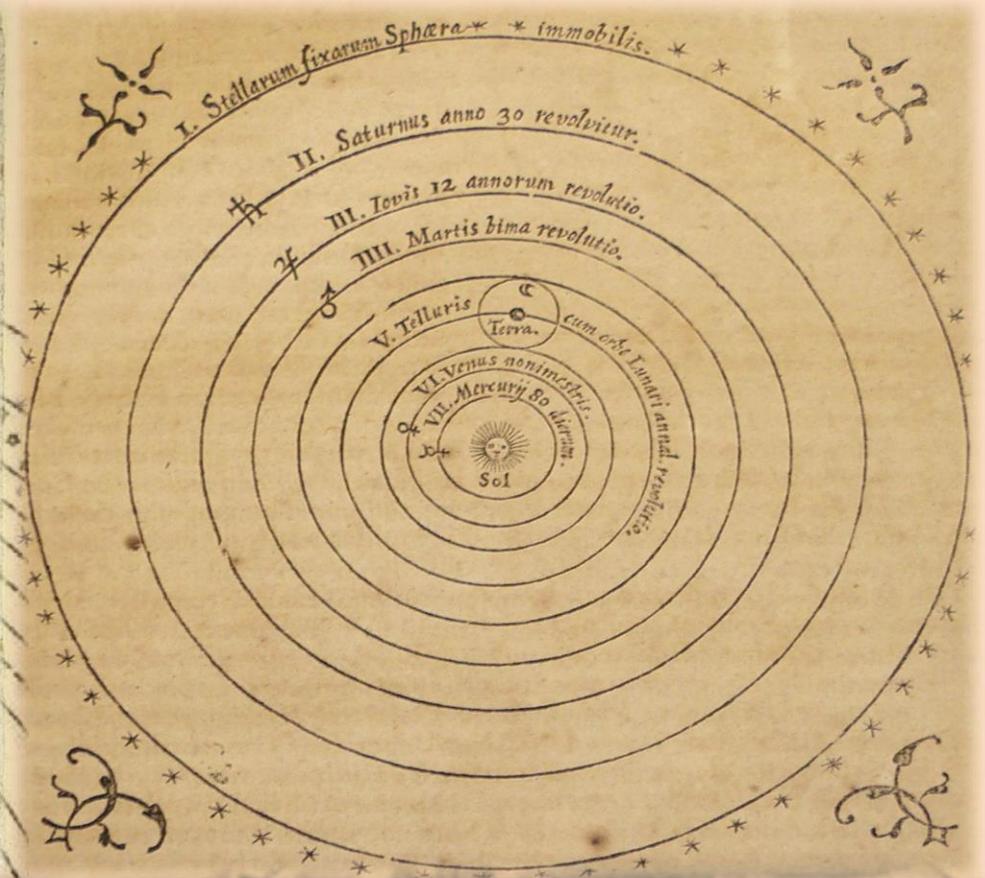
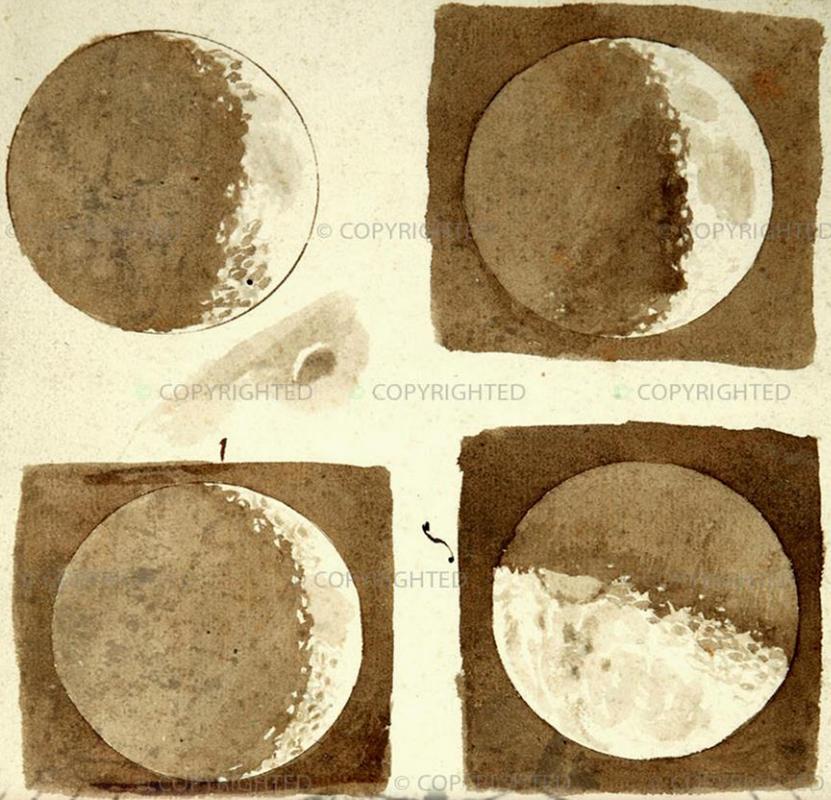
*...una forza costante produce
un moto uniforme...*

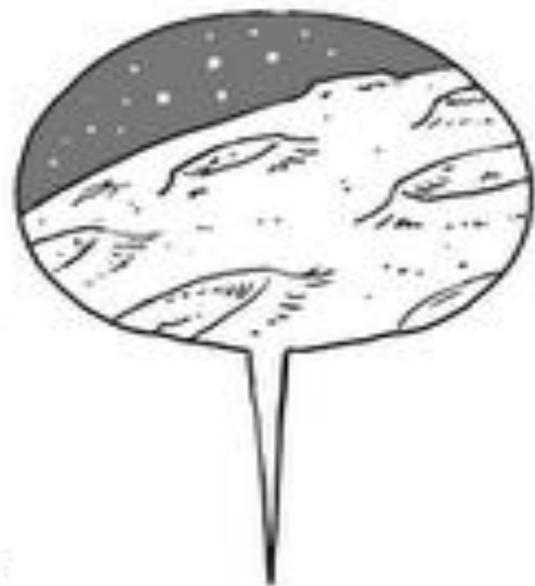
*...la velocità di un corpo nel
vuoto è infinita...*

*...il Sole e gli altri pianeti
girano intorno alla Terra...*



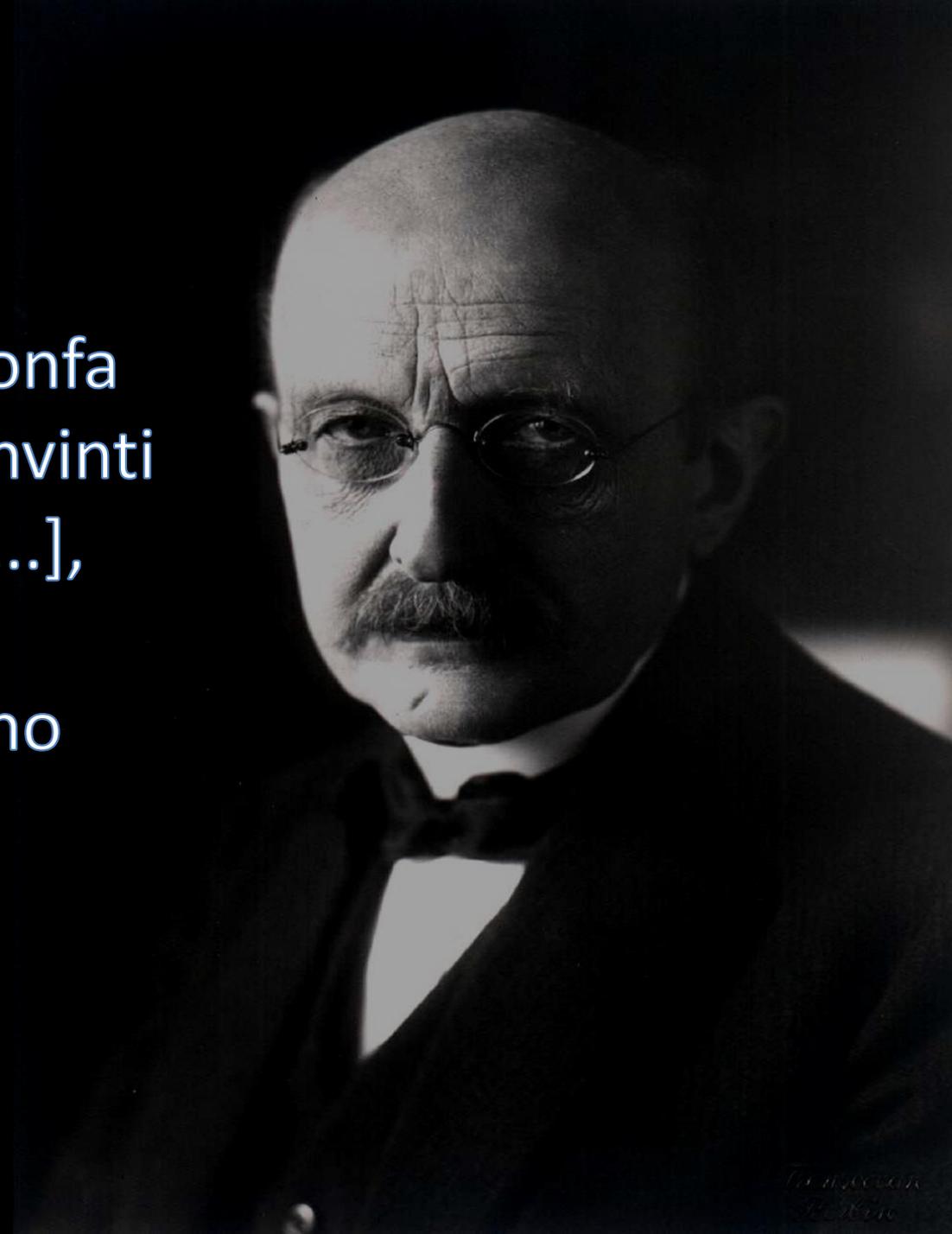




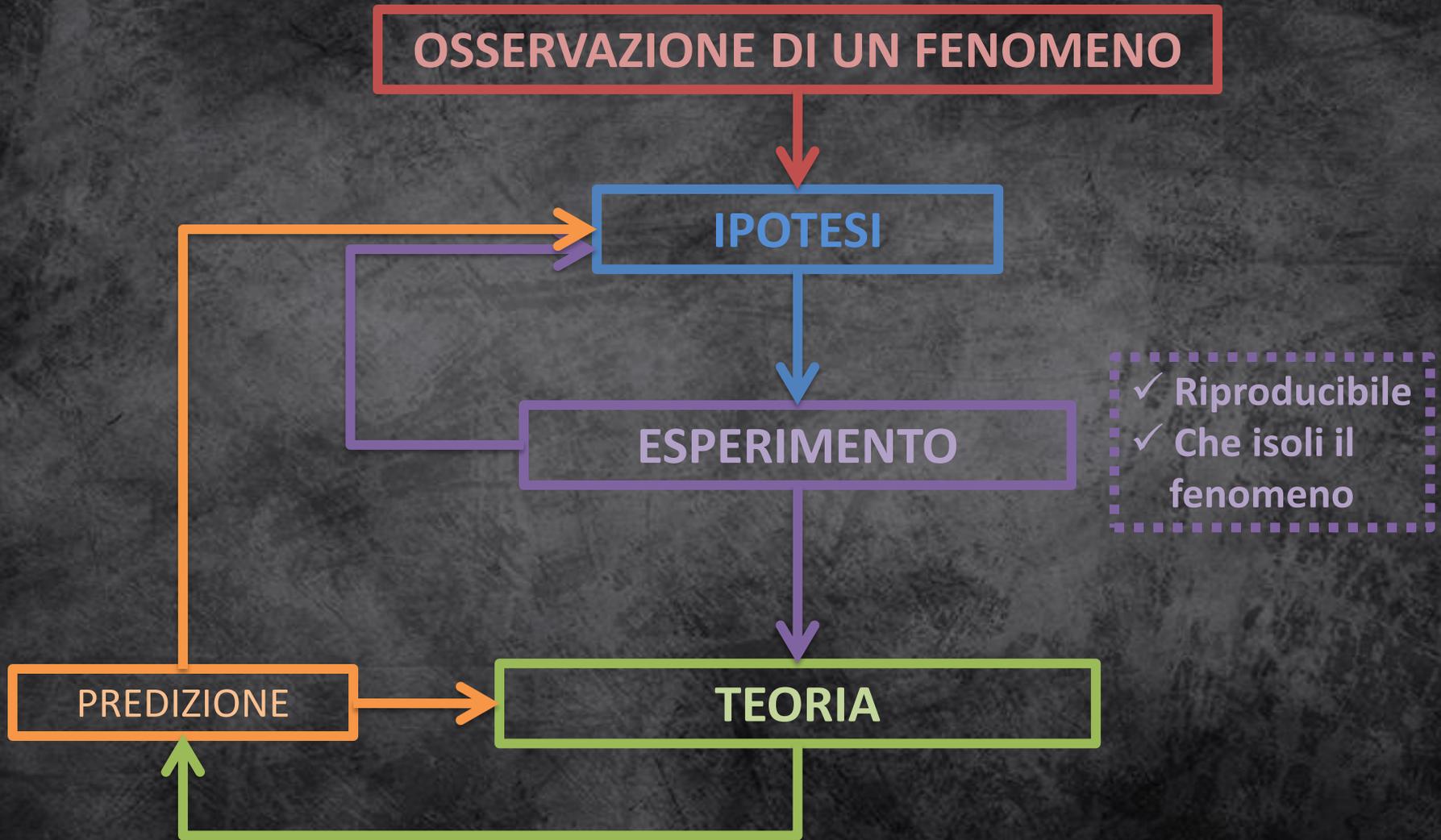


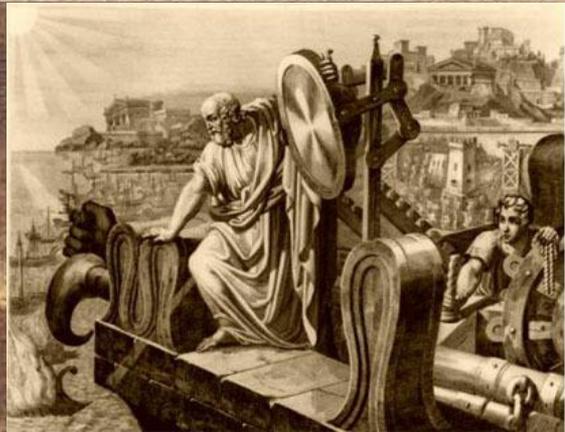
“ Una nuova verità scientifica non trionfa perché si sono convinti i suoi oppositori [...], ma perché tali oppositori finiscono per morire ”

[Max Plank]

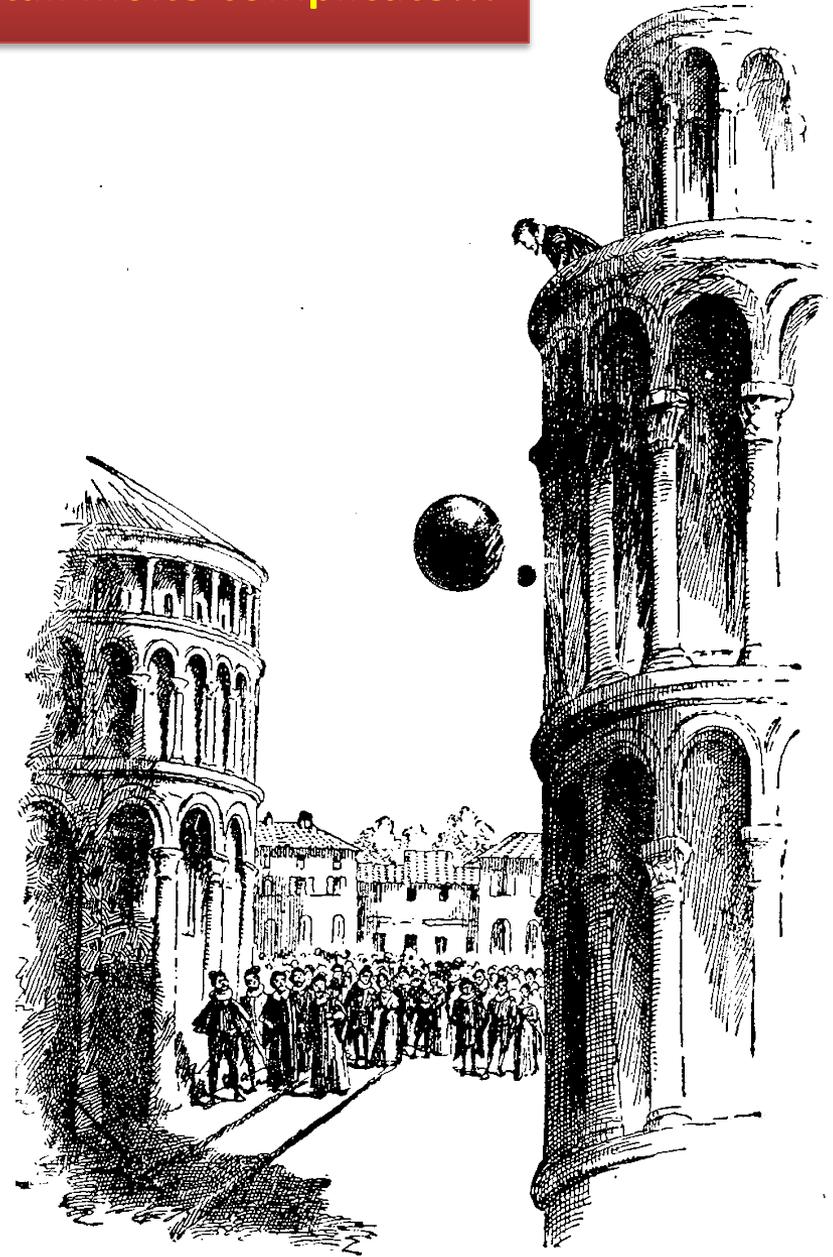
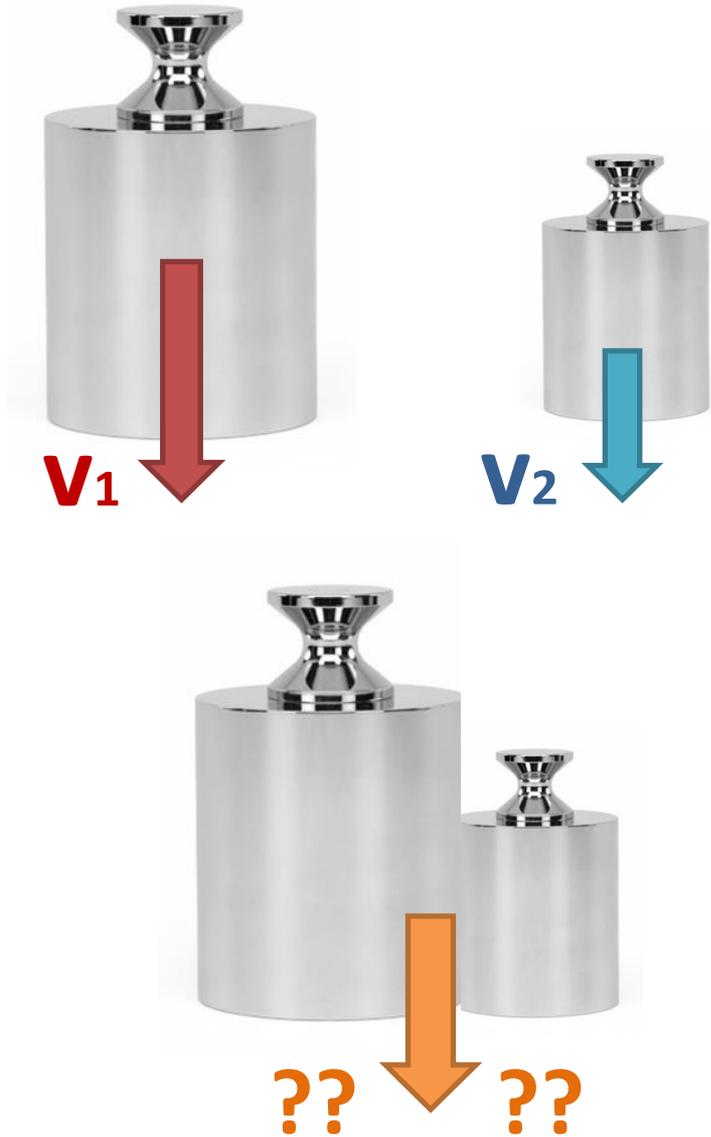


"IL Metodo Scientifico (o Metodo Sperimentale)"





L'intuizione può implicare situazioni sperimentali molto complicate!!!



PULL-ON



VOL

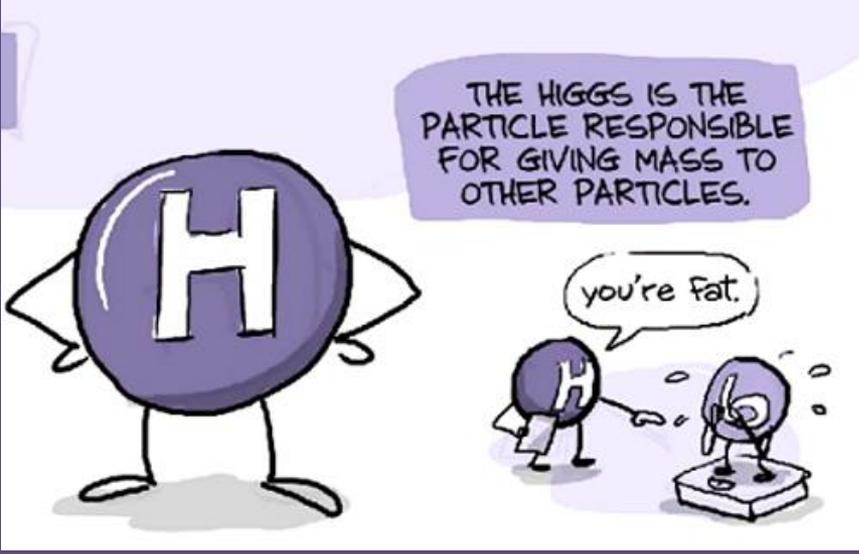


CONT

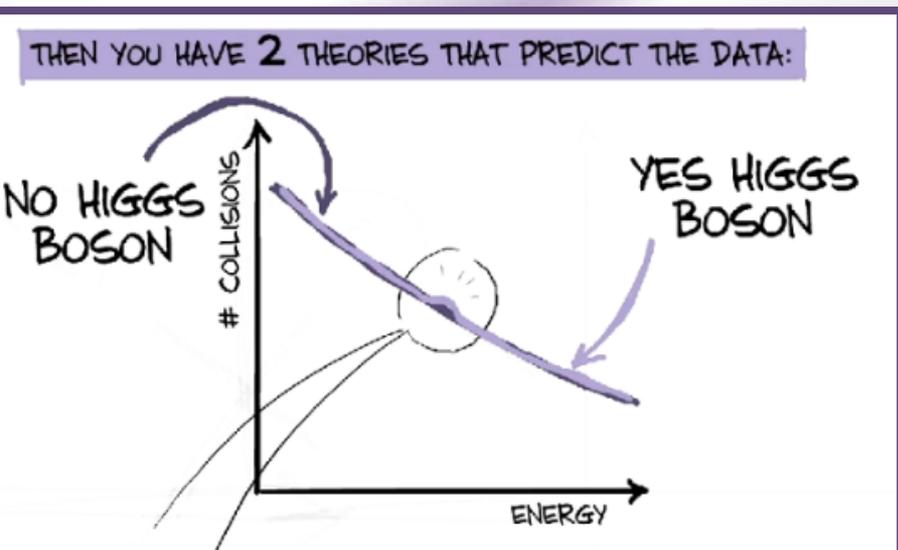


BRIGHT





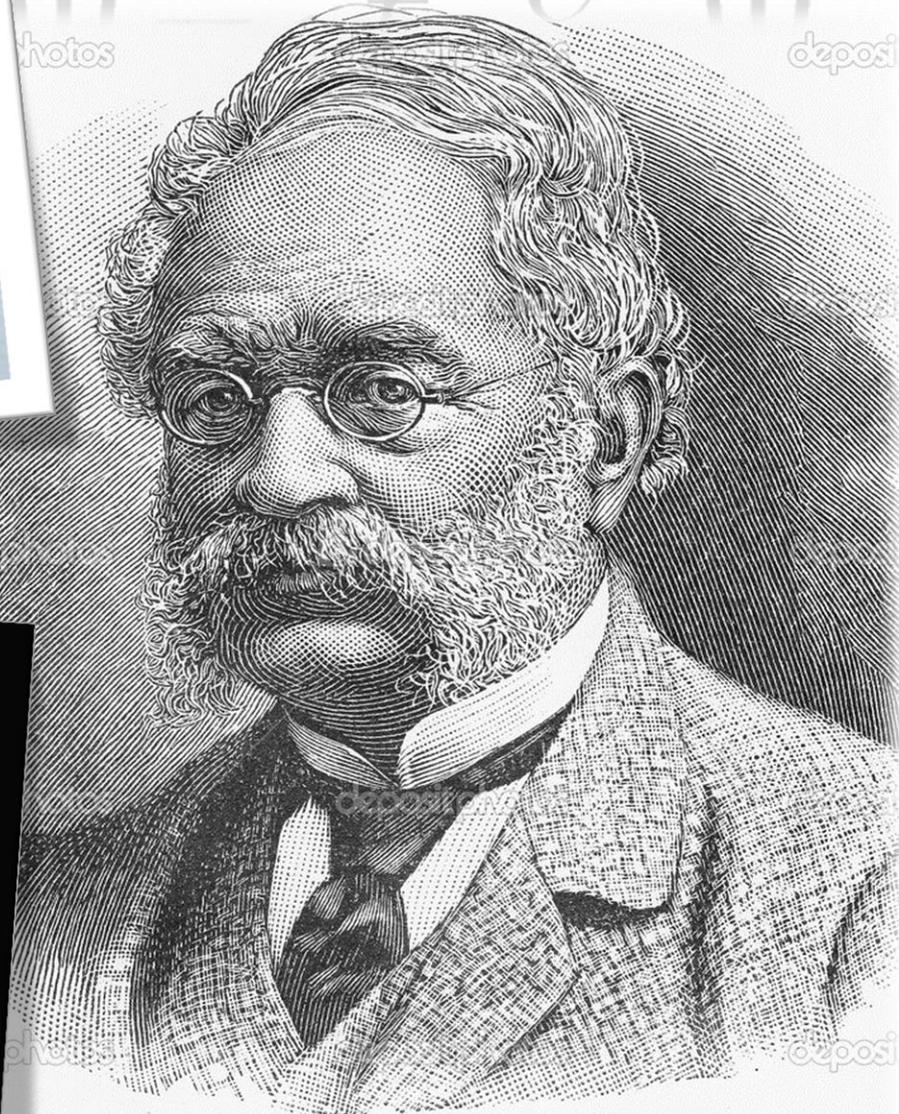
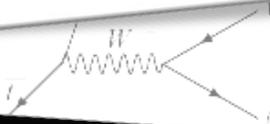
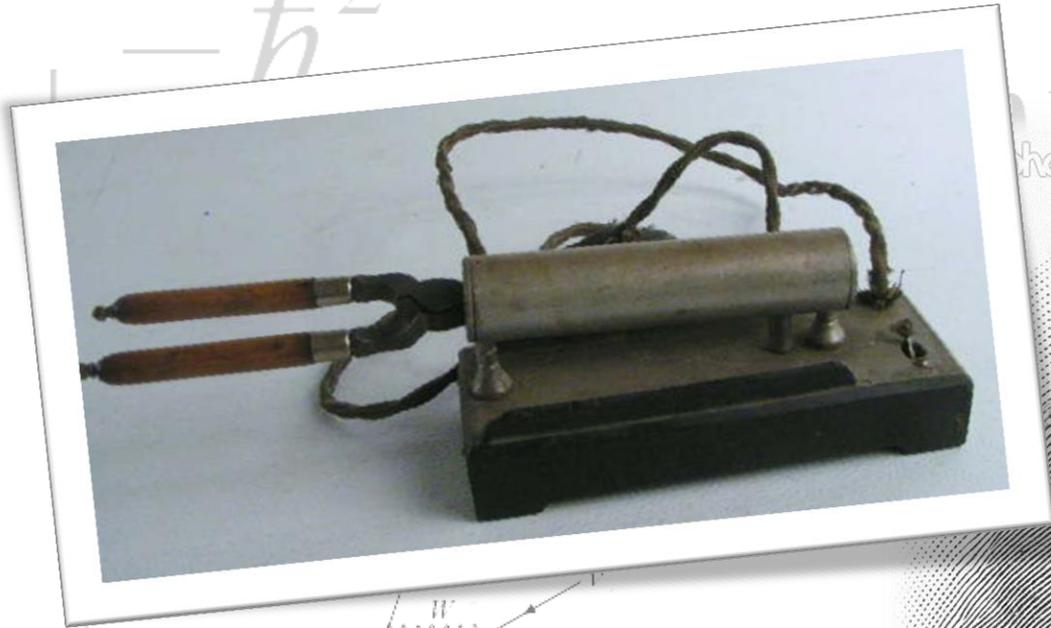
THE HIGGS BOSON EXPLAINED



“Solo” per sapere come possiamo avere una **massa...**

- Collaborazione di **21 nazioni**
- **27 km** di tunnel (100m di profondità)
- 2 detector di **7000t** e **12500t**
- **2.7 mld** di euro (+ **30 mln/anno**)
- 40 milioni di collisioni al secondo
- Mole di dati = **100000 DVD**
- **10000 persone** al lavoro
- L'idea di **2 premi Nobel**





Ernst Werner von Siemens.

Un'ipotesi pazza, dalle pazze conseguenze

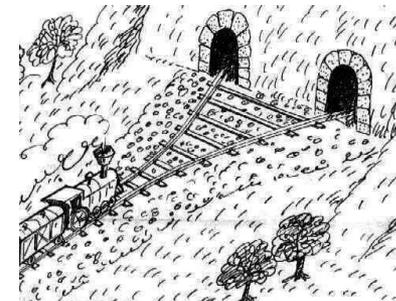
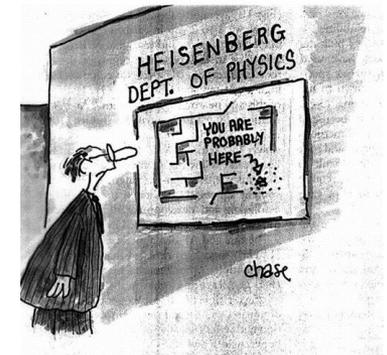
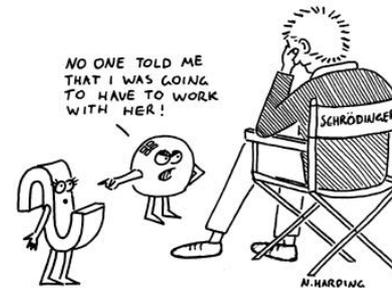
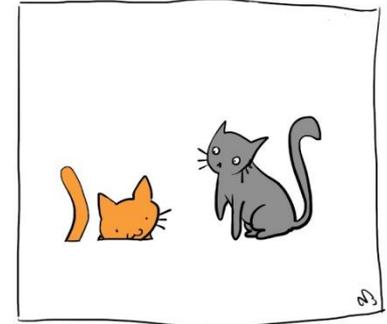
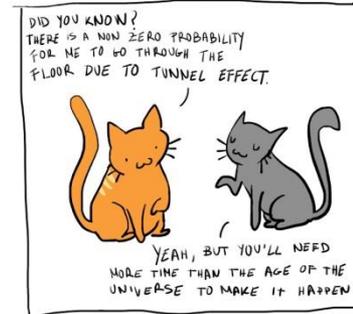
LA MECCANICA QUANTISTICA

Ipotesi pazza

L'energia è quantizzata

(Alcune) pazze conseguenze

- ✓ Le particelle hanno una “doppia natura”...
- ✓ Corpi che attraversano i “muri”...
- ✓ La realtà è governata da leggi di probabilità...
- ✓ Mondi paralleli si snodano per ogni possibilità...
- ✓ Particelle seguono contemporaneamente più percorsi...
- ✓ Particelle che comunicano alla velocità del pensiero...





17/29 hanno vinto un premio Nobel!

SOLVAY CONFERENCE 1927

coloured by postfincolour.com

A. PICARD	E. HENRIOT	P. EHRENFEST	Ed. HERSEN	Th. DE DONDER	E. SCHRÖDINGER	E. VERSCHAFFELT	W. PAULI	W. HEISENBERG	R.H FOWLER	L. BRILLOUIN
P. DEBYE	M. KNUDSEN	W.L. BRAGG	H.A. KRAMERS	P.A.M. DIRAC	A.H. COMPTON	L. de BROGLIE	M. BORN	N. BOHR		
L. LANGMUIR	M. PLANCK	Mme CURIE	H.A. LORENTZ	A. EINSTEIN	P. LANGEVIN	Ch.E. GUYE	C.T.R. WILSON	O.W. RICHARDSON		

Absents : Sir W.H. BRAGG, H. DESLANDRES et E. VAN AUBEL

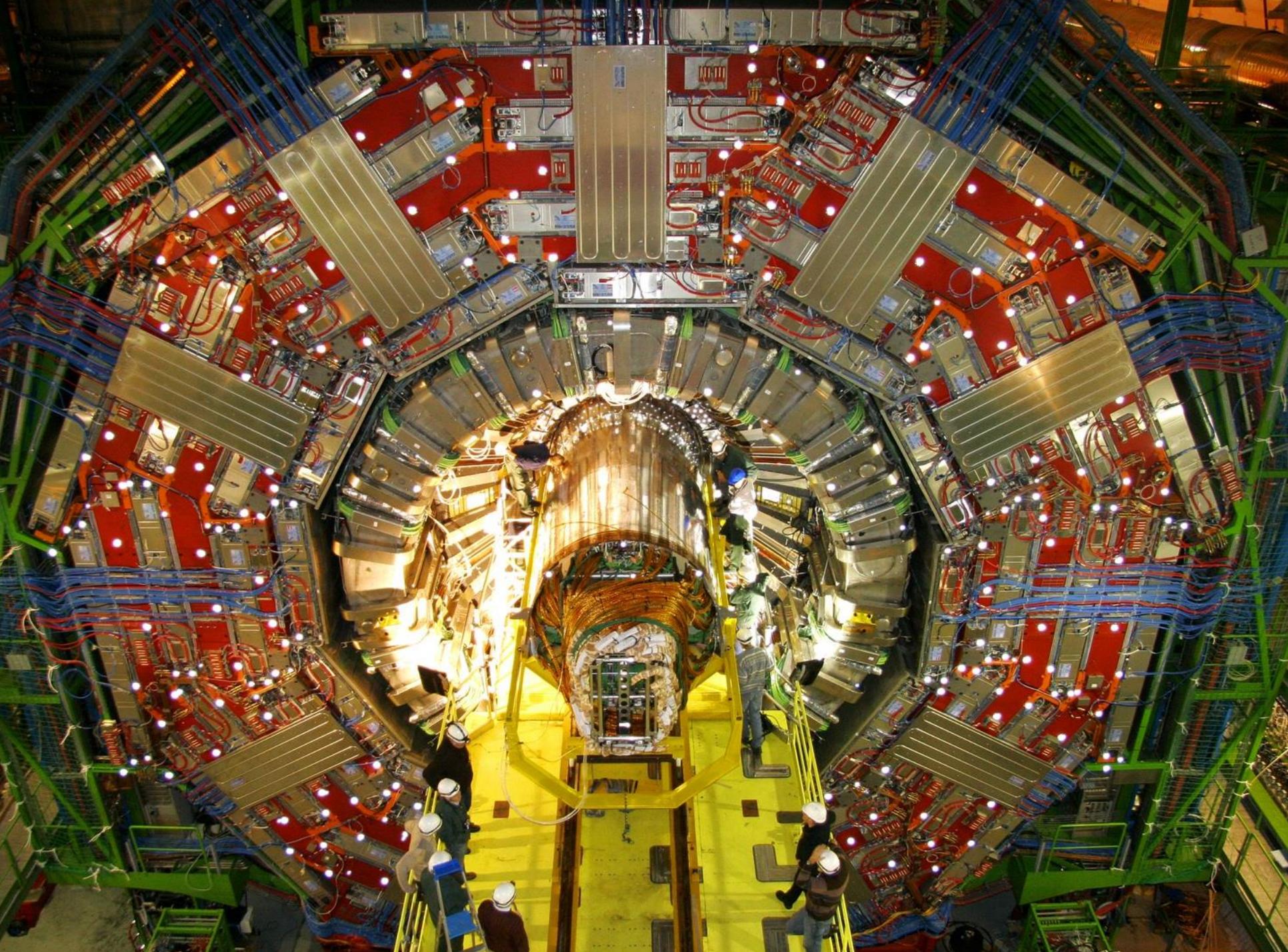


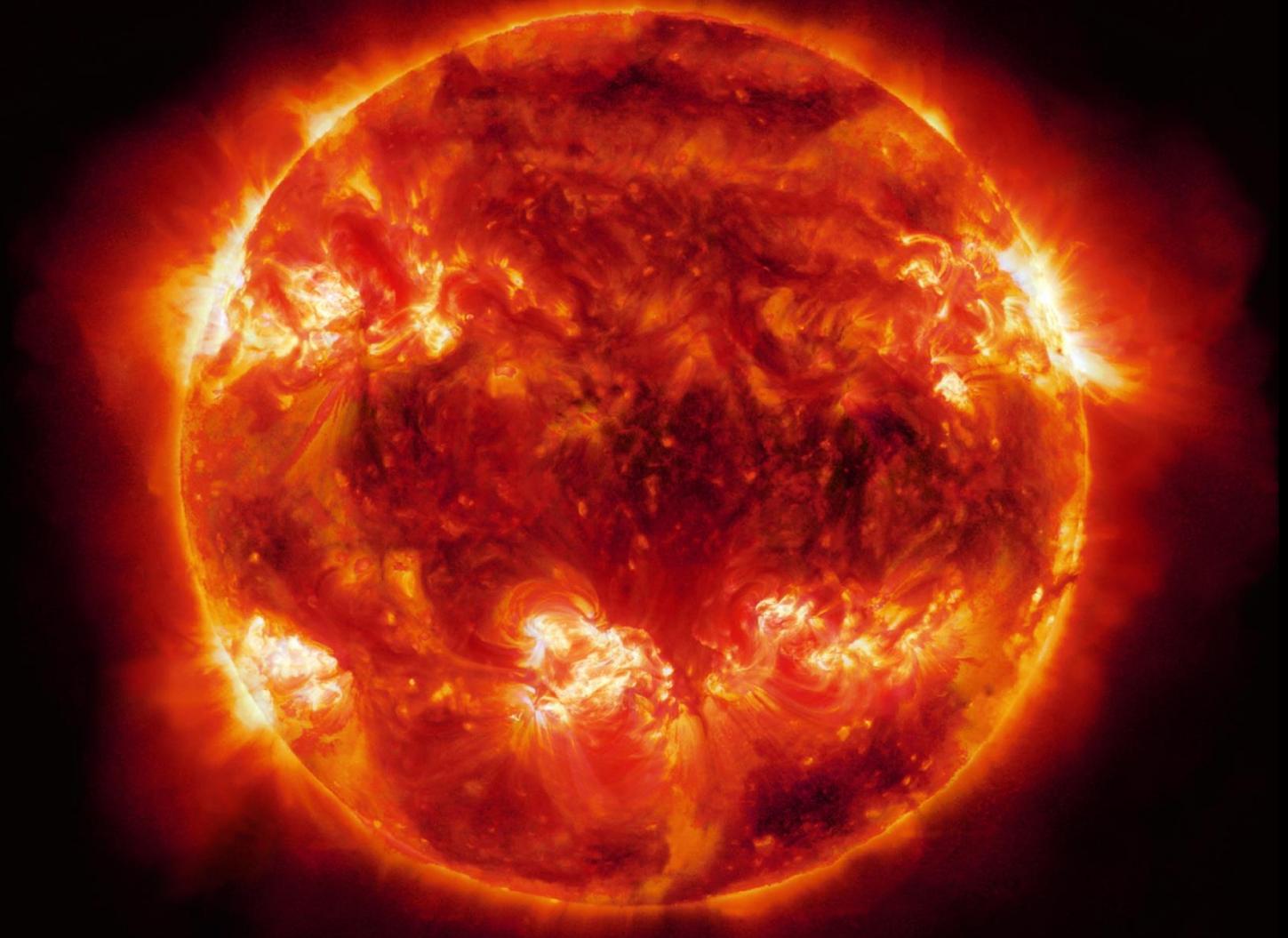
SOLVAY CONFERENCE 1927

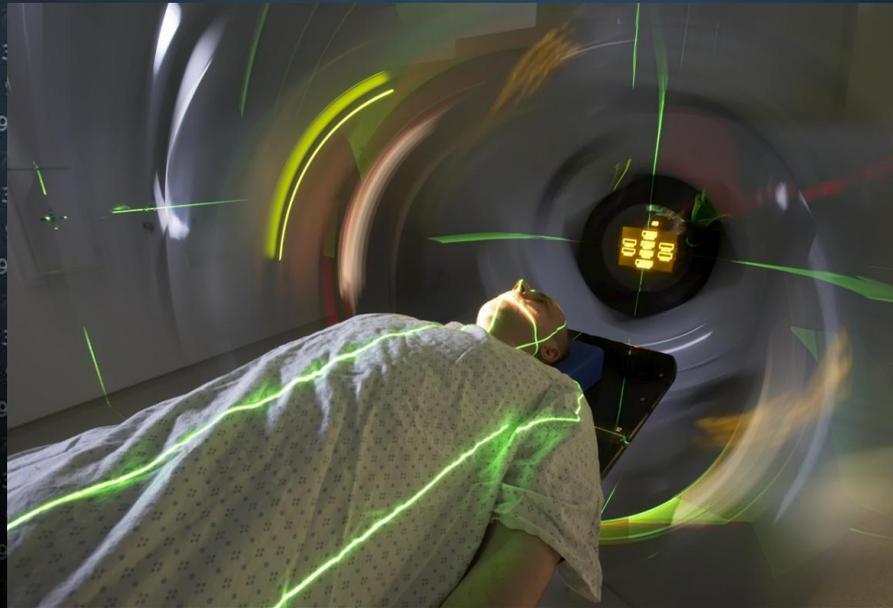
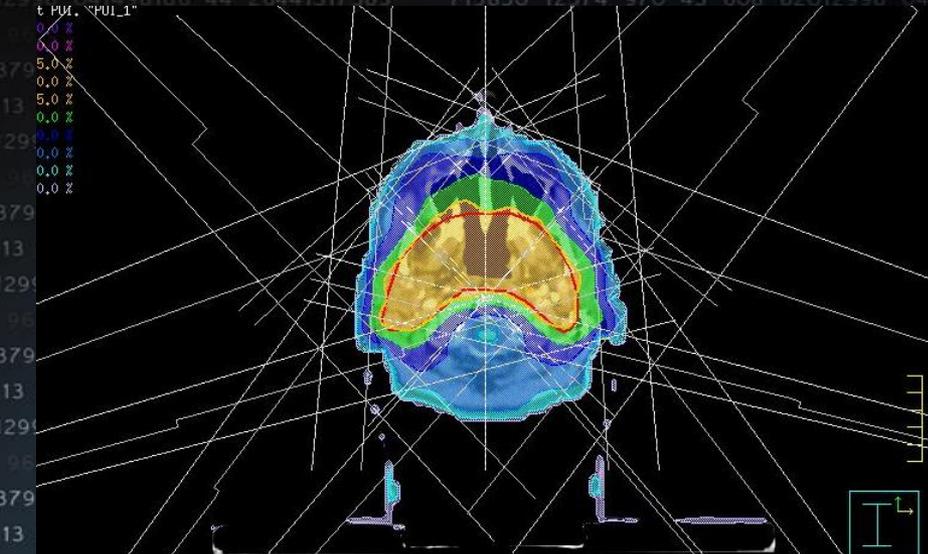
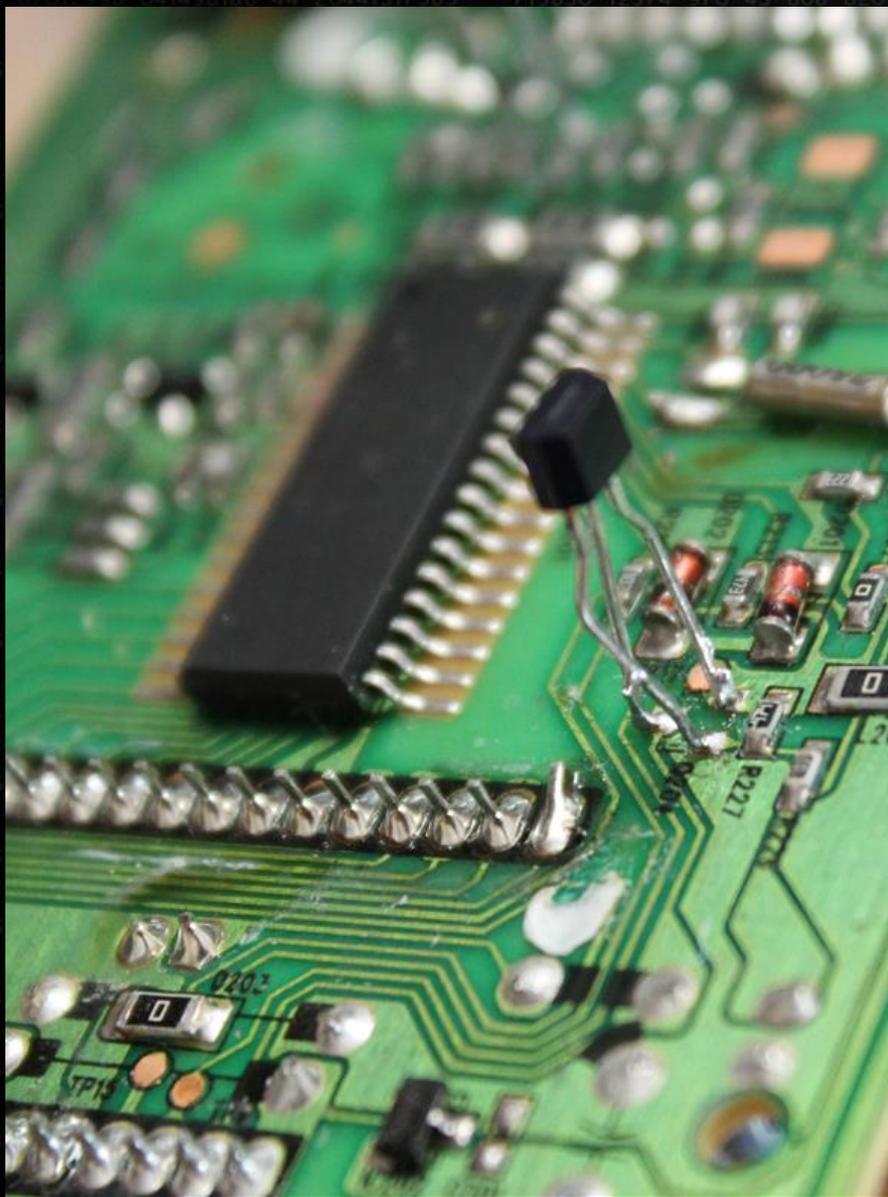
coloured by postfincolour.com

A. PICARD	E. HENRIOT	<u>P. EHRENFEST</u>	Ed. HERSEN	Th. DE DONDER	E. SCHRÖDINGER	E. VERSCHAFFELT	W. PAULI	W. HEISENBERG	R.H FOWLER	L. BRILLOUIN
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L. LANGMUIR	M. PLANCK	Mme CURIE	H.A. LORENTZ	A. EINSTEIN	P. LANGEVIN	Ch.E. GUYE	C.T.R. WILSON	O.W. RICHARDSON		

Absents : Sr W.H. BRAGG, H. DESLANDRES et E. VAN AUBEL







Il superamento della Meccanica Classica avviene a causa di fenomeni osservati non spiegabili in base alla teoria nota

NON SPIEGA CORRETTAMENTE IL MONDO MICROSCOPICO!

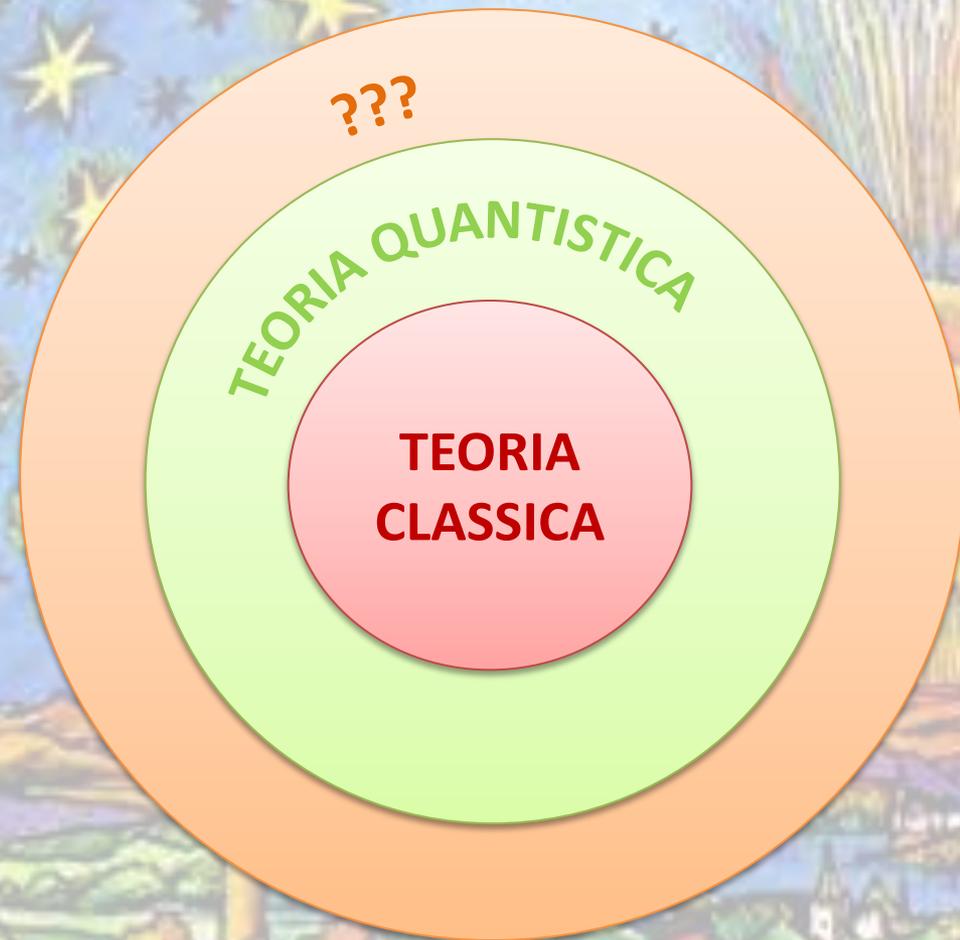
(i.e. luce emessa dai corpi caldi e stabilità degli atomi)

LA TEORIA CLASSICA NON E' SBAGLIATA!

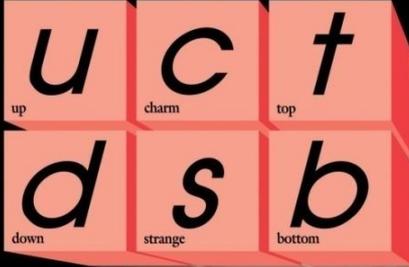
(come quella Aristotelica)

HA SOLO UN LIMITATO RANGE DI VALIDITA'!

(non vale per oggetti microscopici e per velocità molto grandi)

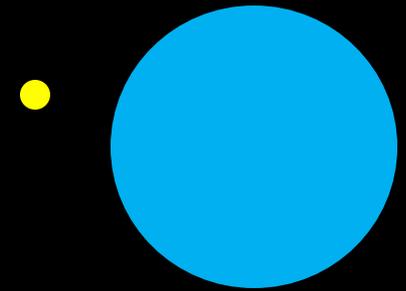


Quarks

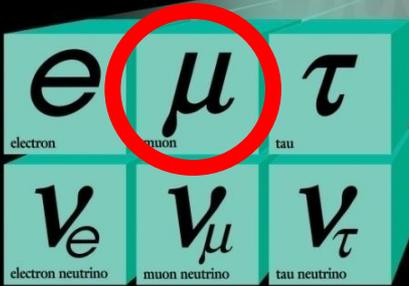
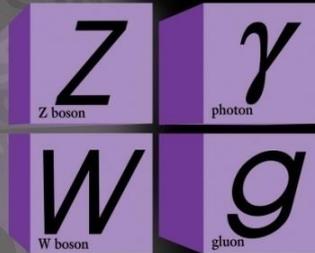


ELETTRONE

MUONE

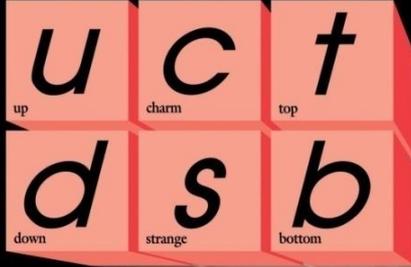


Forces



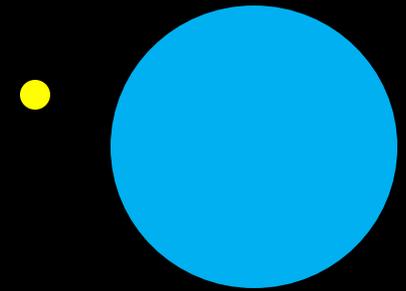
Leptons

Quarks

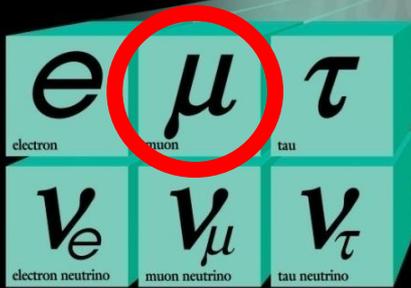
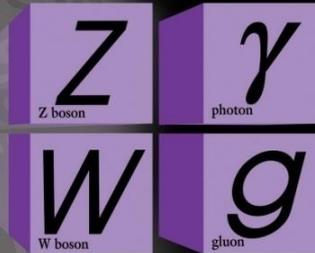


ELETTRONE

MUONE



Forces

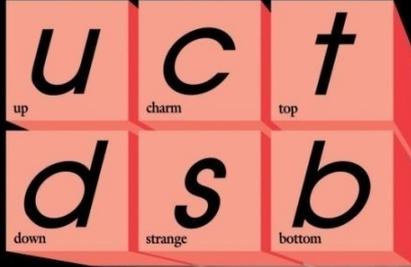


Leptons

TEORIA $a = (0.001)$

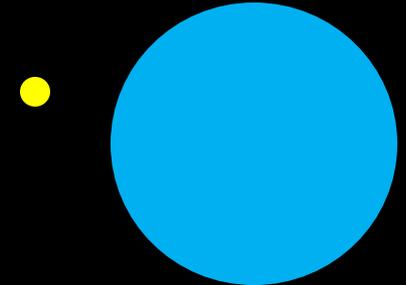
ESPERIM. $a = (0.001)$

Quarks

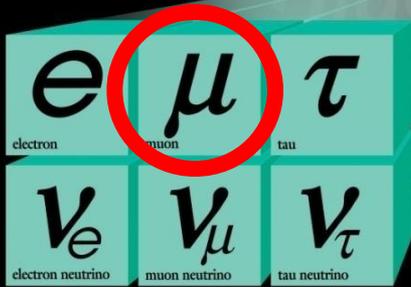
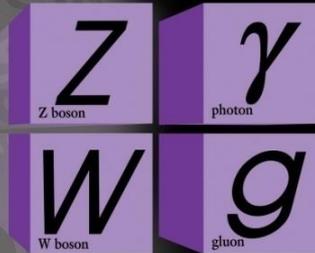


ELETTRONE

MUONE



Forces



Leptons

TEORIA $a = (0.0011)$

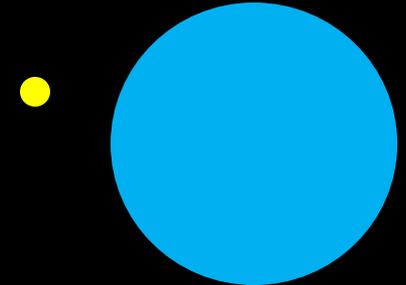
ESPERIM. $a = (0.0011)$

Quarks

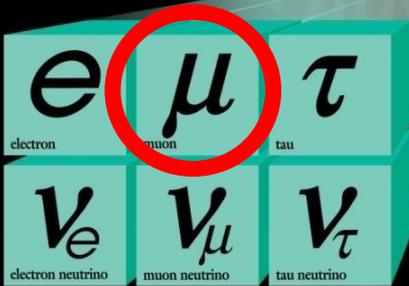
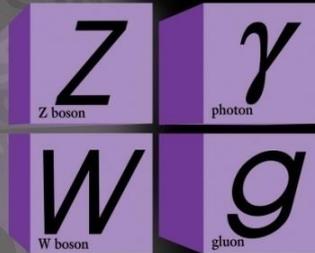


ELETTRONE

MUONE



Forces

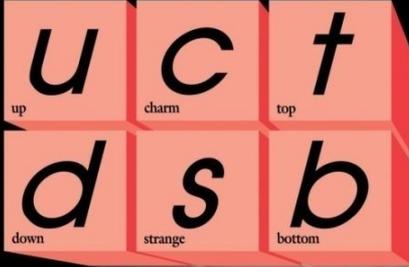


Leptons

TEORIA $a = (0.00116)$

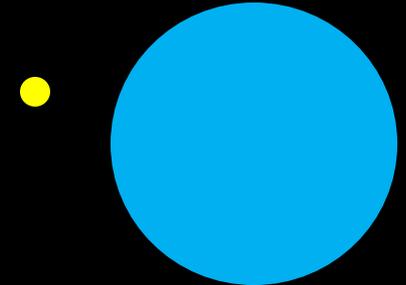
ESPERIM. $a = (0.00116)$

Quarks

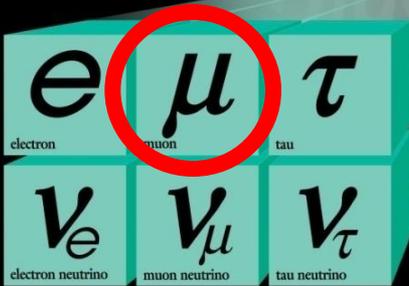
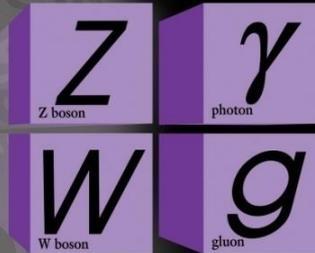


ELETTRONE

MUONE



Forces

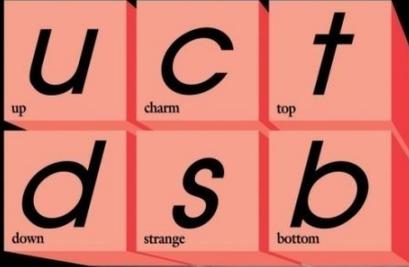


Leptons

TEORIA $a = (0.001165)$

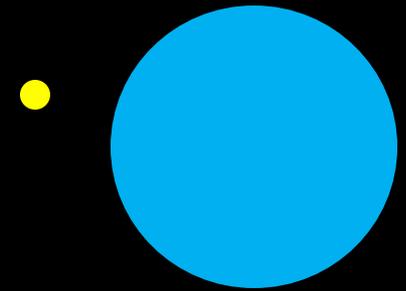
ESPERIM. $a = (0.001165)$

Quarks

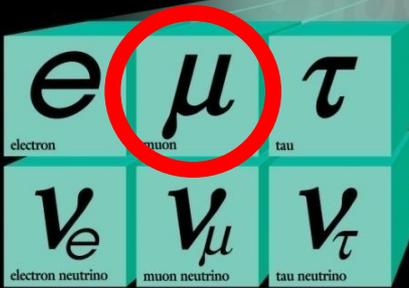
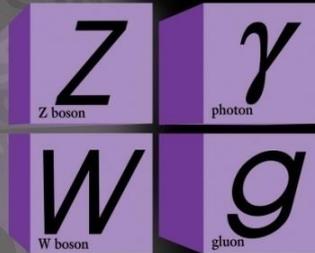


ELETTRONE

MUONE



Forces



Leptons

TEORIA $a = (0.0011659)$

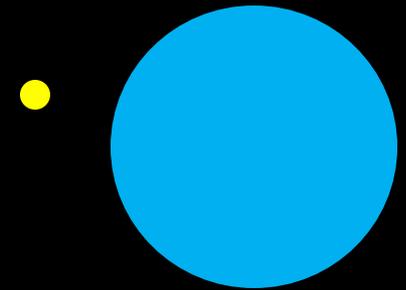
ESPERIM. $a = (0.0011659)$

Quarks

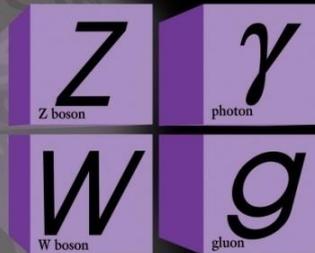


ELETTRONE

MUONE



Forces

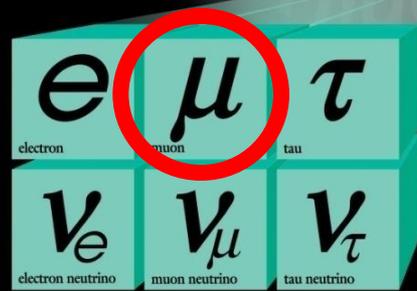
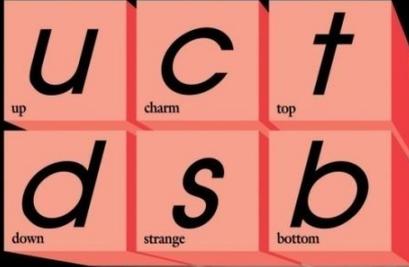


Leptons

TEORIA $a = (0.00116592)$

ESPERIM. $a = (0.00116591)$

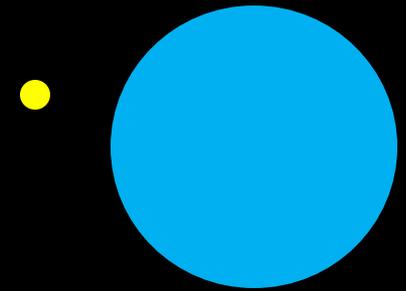
Quarks



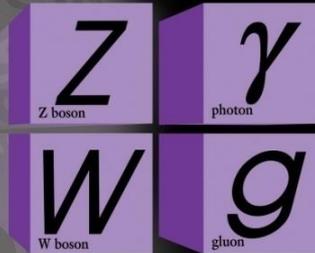
Leptons

ELETTRONE

MUONE



Forces



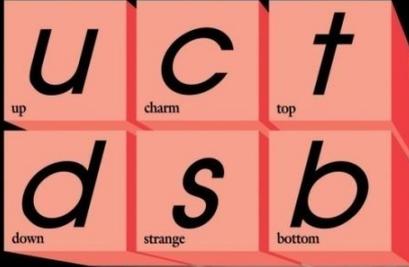
TEORIA

$$a = (0.00116592089 \pm 0.000000000063)$$

ESPERIM.

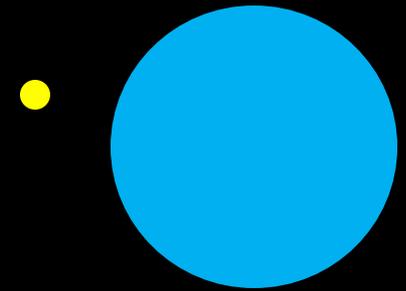
$$a = (0.00116591802 \pm 0.000000000049)$$

Quarks

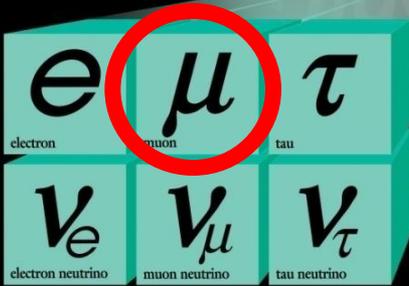
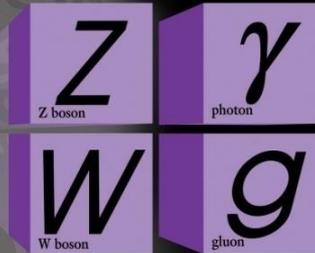


ELETTRONE

MUONE



Forces



Leptons

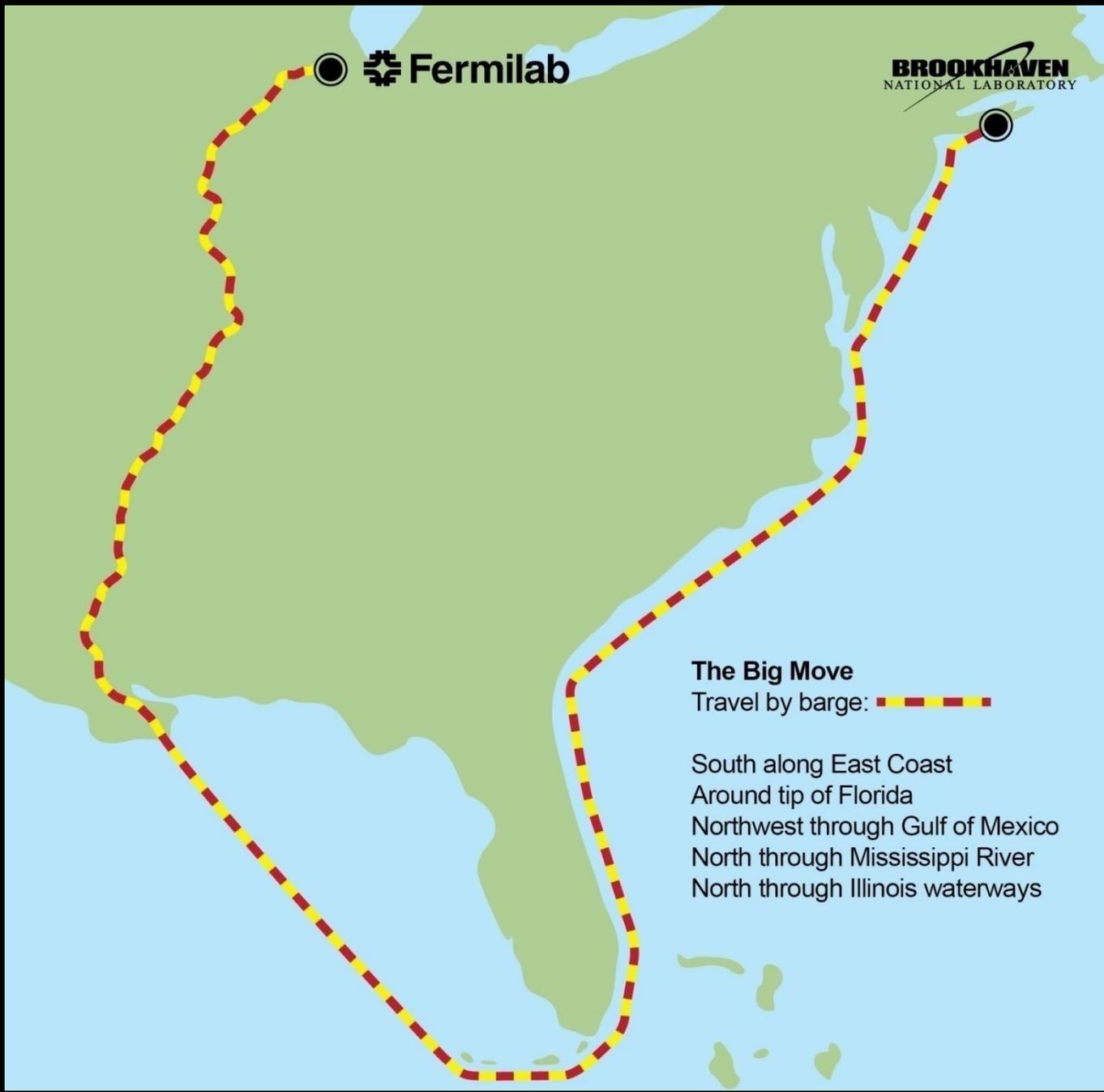
TEORIA

$$a = (0.00116592026)$$

ESPERIM.

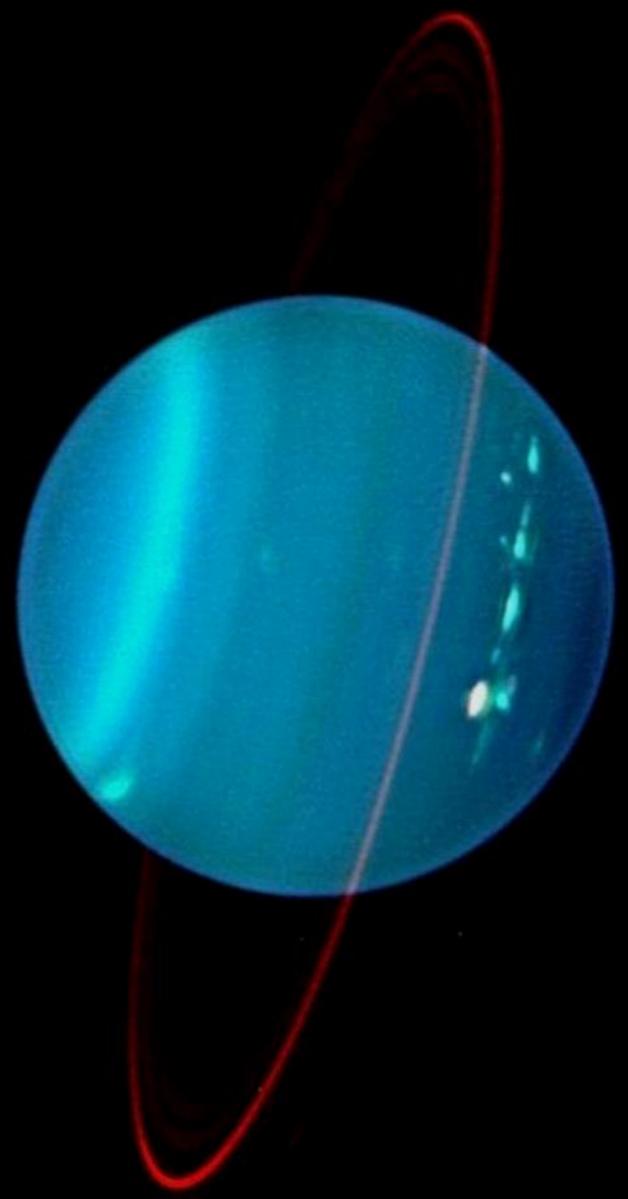
$$a = (0.00116591753)$$







H. J. Detouche, Parigi, XIX secolo



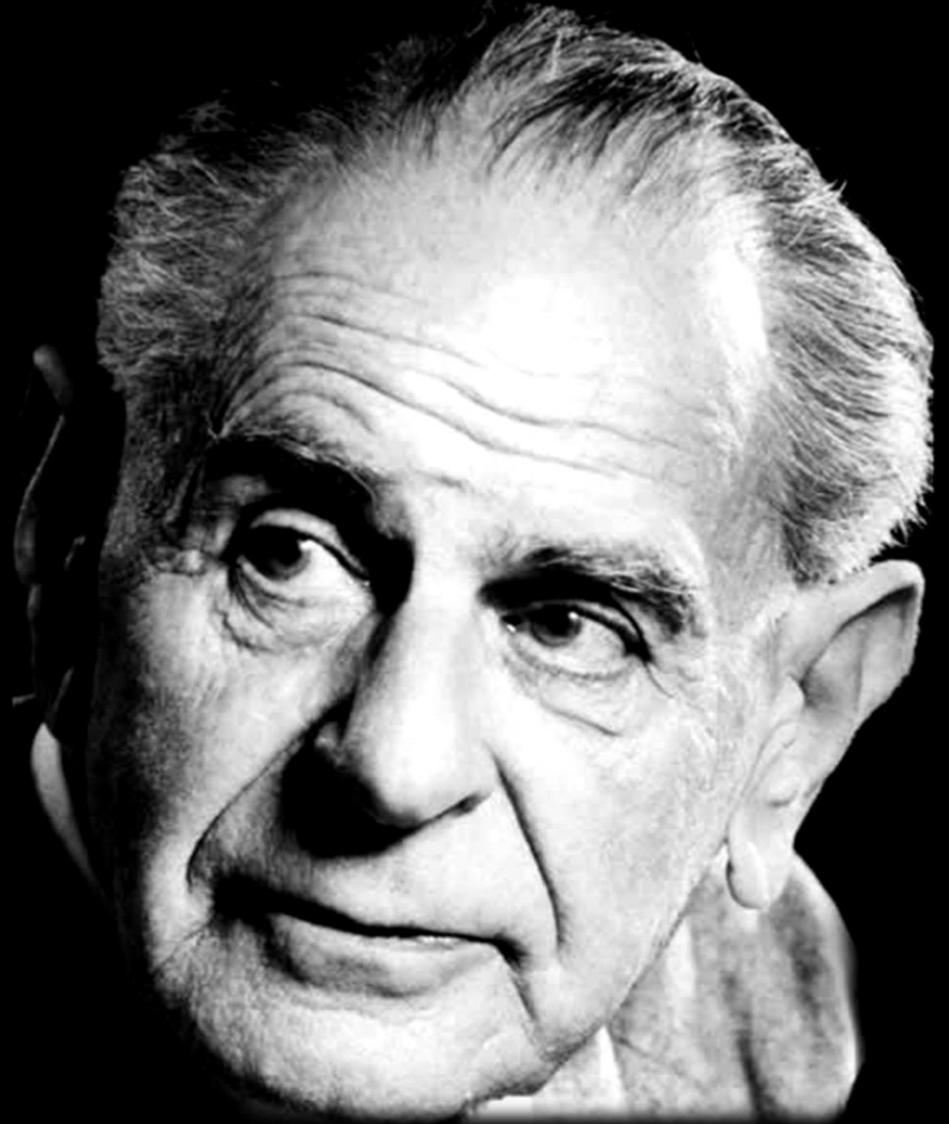


“

L'inconfutabilità di una teoria non è (come spesso si crede) un pregio, bensì un difetto. Ogni controllo genuino di una teoria è un tentativo di falsificarla, o di confutarla. La controllabilità coincide con la falsificabilità

”

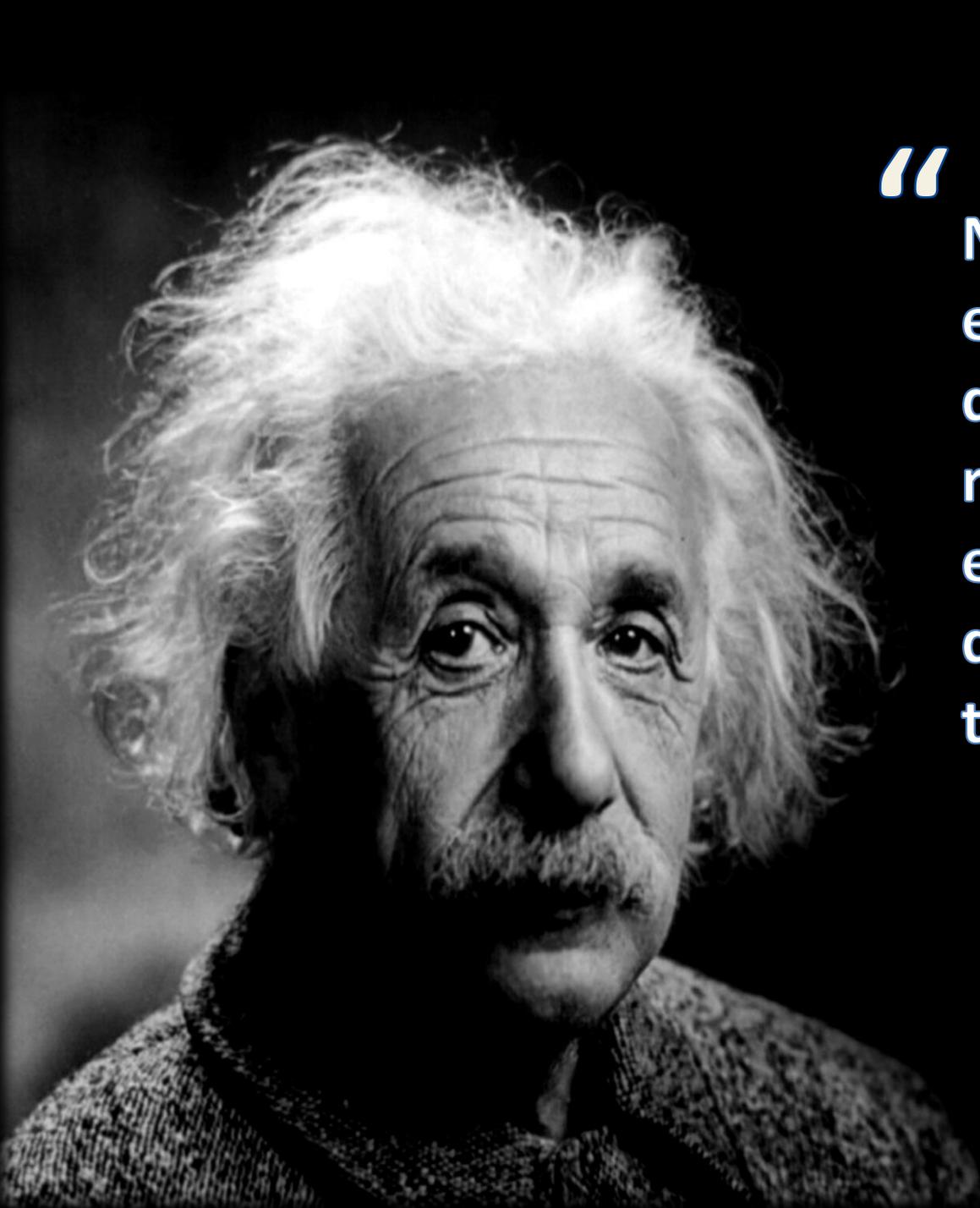
[Karl Popper]



**“
Il dramma della
scienza è la
distruzione di una
bellissima teoria da
parte di un brutto
dato di fatto ”**

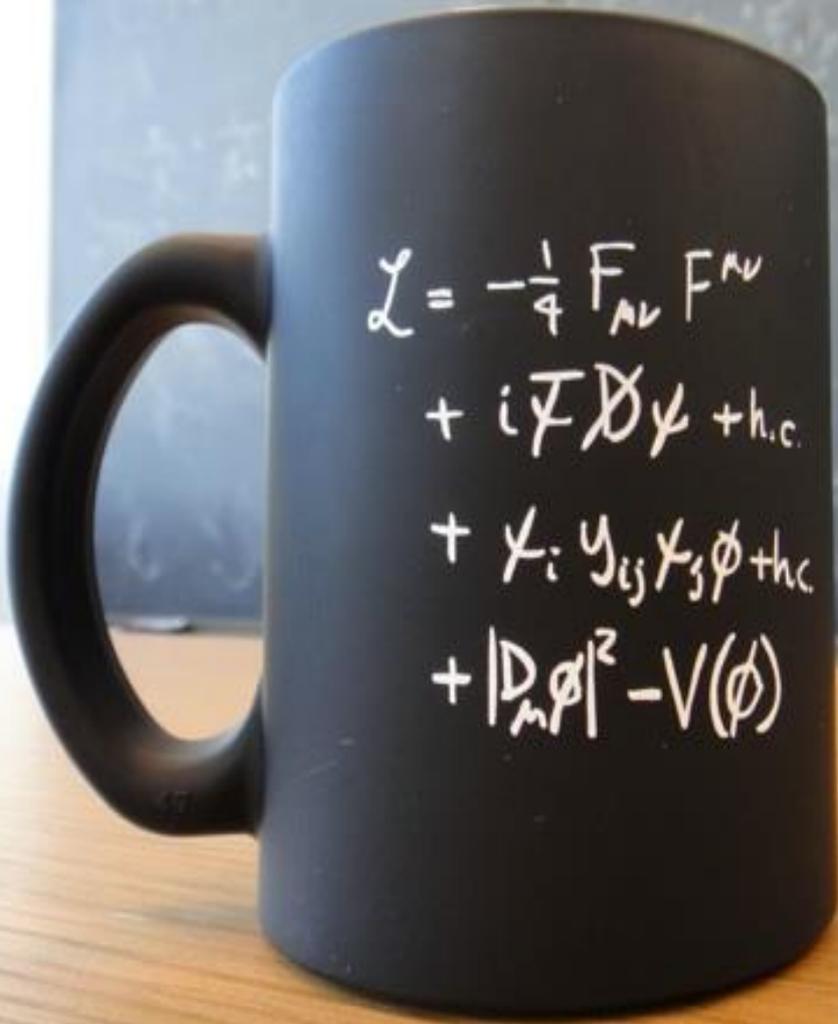
[Thomas Huxley]





**“
Nessuna quantità di
esperimenti potrà
dimostrare che ho
ragione, ma un solo
esperimento potrà
dimostrare che ho
torto!!!
”**

[Albert Einstein]



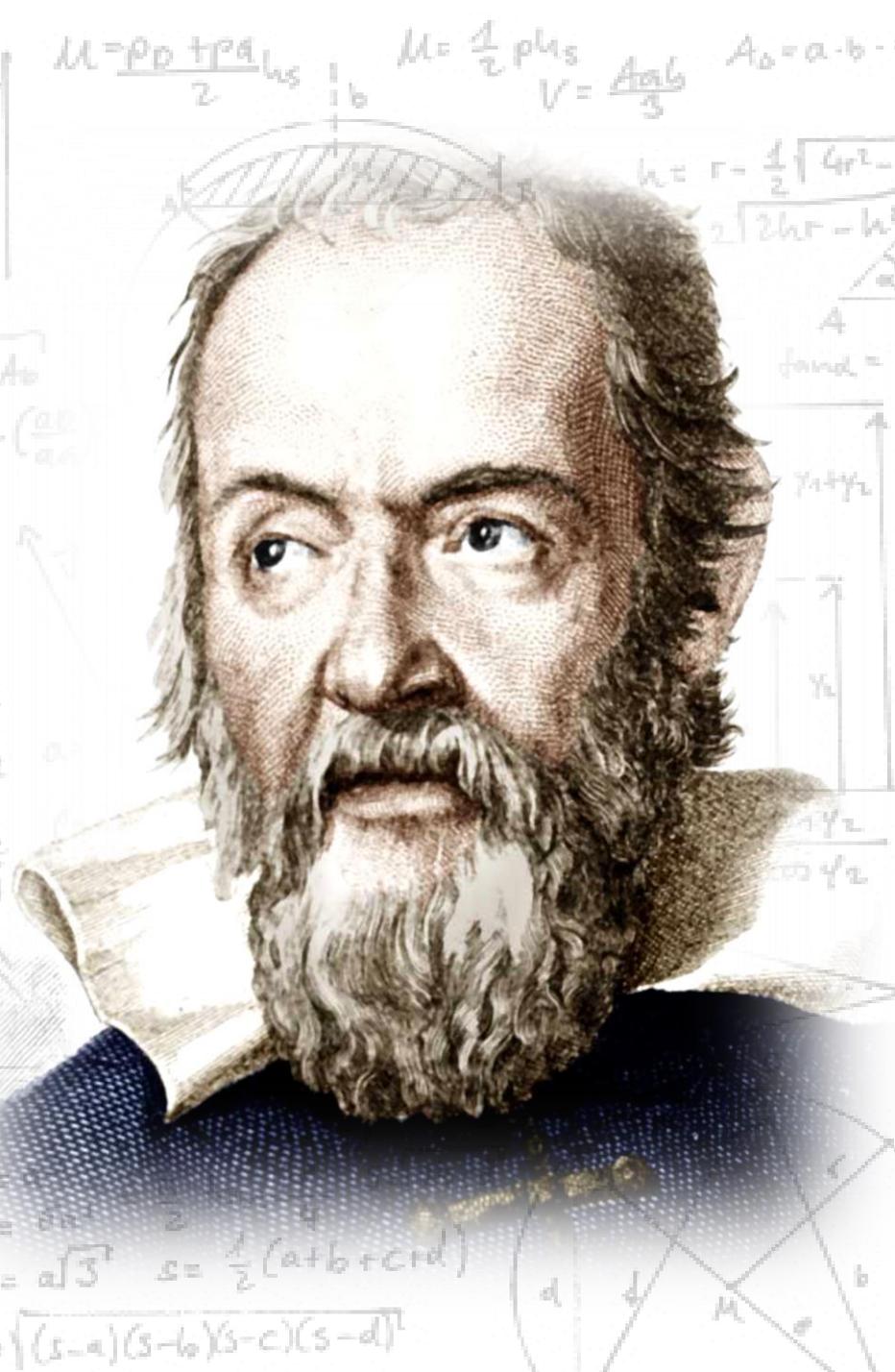
$$\mathcal{L}_{\text{StandardModel}} = -\frac{1}{2}\partial_\nu g_\mu^a \partial_\nu g_\mu^a - g_s f^{abc} \partial_\mu g_\nu^a g_\mu^b g_\nu^c - \frac{1}{4}g_s^2 f^{abc} f^{ade} g_\mu^b g_\nu^c g_\mu^d g_\nu^e + \frac{1}{2}ig_s^2 (\bar{q}_i^\mu \gamma^\mu q_j^\nu) g_\mu^a + \bar{G}^a \partial^2 G^a + g_s f^{abc} \partial_\mu \bar{G}^a G^b g_\mu^c - \partial_\nu W_\mu^+ \partial_\nu W_\mu^- - M^2 W_\mu^+ W_\mu^- - \frac{1}{2}\partial_\nu Z_\mu^0 \partial_\nu Z_\mu^0 - \frac{1}{2c_w^2} M^2 Z_\mu^0 Z_\mu^0 - \frac{1}{2}\partial_\mu A_\nu \partial_\mu A_\nu - \frac{1}{2}\partial_\mu H \partial_\mu H - \frac{1}{2}m_h^2 H^2 - \partial_\mu \phi^+ \partial_\mu \phi^- - M^2 \phi^+ \phi^- - \frac{1}{2}\partial_\mu \phi^0 \partial_\mu \phi^0 - \frac{1}{2c_w} M \phi^0 \phi^0 - \beta_h [\frac{2M^2}{g^2} + \frac{2M}{g} H + \frac{1}{2}(H^2 + \phi^0 \phi^0 + 2\phi^+ \phi^-)] + \frac{2M^4}{g^2} \alpha_h - igc_w [\partial_\nu Z_\mu^0 (W_\mu^+ W_\nu^- - W_\nu^+ W_\mu^-) - Z_\nu^0 (W_\mu^+ \partial_\nu W_\mu^- - W_\mu^- \partial_\nu W_\mu^+) + Z_\mu^0 (W_\nu^+ \partial_\nu W_\mu^- - W_\nu^- \partial_\nu W_\mu^+)] - ig s_w [\partial_\nu A_\mu (W_\mu^+ W_\nu^- - W_\nu^+ W_\mu^-) - A_\nu (W_\mu^+ \partial_\nu W_\mu^- - W_\mu^- \partial_\nu W_\mu^+) + A_\mu (W_\nu^+ \partial_\nu W_\mu^- - W_\nu^- \partial_\nu W_\mu^+)] - \frac{1}{2}g^2 W_\mu^+ W_\mu^- W_\nu^+ W_\nu^- + \frac{1}{2}g^2 W_\mu^+ W_\nu^- W_\mu^- W_\nu^+ + g^2 c_w^2 (Z_\mu^0 W_\mu^+ Z_\nu^0 W_\nu^- - Z_\mu^0 Z_\nu^0 W_\mu^+ W_\nu^-) + g^2 s_w^2 (A_\mu W_\mu^+ A_\nu W_\nu^- - A_\mu A_\nu W_\mu^+ W_\nu^-) + g^2 s_w c_w [A_\mu Z_\nu^0 (W_\mu^+ W_\nu^- - W_\nu^+ W_\mu^-) - 2A_\mu Z_\mu^0 W_\nu^+ W_\nu^-] - g\alpha [H^3 + H\phi^0 \phi^0 + 2H\phi^+ \phi^-] - \frac{1}{8}g^2 \alpha_h [H^4 + (\phi^0)^4 + 4(\phi^+ \phi^-)^2 + 4(\phi^0)^2 \phi^+ \phi^- + 4H^2 \phi^+ \phi^- + 2(\phi^0)^2 H^2] - gM W_\mu^+ W_\mu^- H - \frac{1}{2}g \frac{M}{c_w} Z_\mu^0 Z_\mu^0 H - \frac{1}{2}ig [W_\mu^+ (\phi^0 \partial_\mu \phi^- - \phi^- \partial_\mu \phi^0) - W_\mu^- (\phi^0 \partial_\mu \phi^+ - \phi^+ \partial_\mu \phi^0)] + \frac{1}{2}g [W_\mu^+ (H \partial_\mu \phi^- - \phi^- \partial_\mu H) - W_\mu^- (H \partial_\mu \phi^+ - \phi^+ \partial_\mu H)] + \frac{1}{2}g \frac{1}{c_w} (Z_\mu^0 (H \partial_\mu \phi^0 - \phi^0 \partial_\mu H) - ig \frac{s_w^2}{c_w} M Z_\mu^0 (W_\mu^+ \phi^- - W_\mu^- \phi^+) + ig s_w M A_\mu (W_\mu^+ \phi^- - W_\mu^- \phi^+) - ig \frac{1-2c_w^2}{2c_w} Z_\mu^0 (\phi^+ \partial_\mu \phi^- - \phi^- \partial_\mu \phi^+) + ig s_w A_\mu (\phi^+ \partial_\mu \phi^- - \phi^- \partial_\mu \phi^+) - \frac{1}{4}g^2 W_\mu^+ W_\mu^- [H^2 + (\phi^0)^2 + 2\phi^+ \phi^-] - \frac{1}{4}g^2 \frac{1}{c_w^2} Z_\mu^0 Z_\mu^0 [H^2 + (\phi^0)^2 + 2(2s_w^2 - 1)^2 \phi^+ \phi^-] - \frac{1}{2}g^2 \frac{s_w^2}{c_w} Z_\mu^0 \phi^0 (W_\mu^+ \phi^- + W_\mu^- \phi^+) - \frac{1}{2}ig^2 \frac{s_w^2}{c_w} Z_\mu^0 H (W_\mu^+ \phi^- - W_\mu^- \phi^+) + \frac{1}{2}g^2 s_w A_\mu \phi^0 (W_\mu^+ \phi^- + W_\mu^- \phi^+) + \frac{1}{2}ig^2 s_w A_\mu H (W_\mu^+ \phi^- - W_\mu^- \phi^+) - g^2 \frac{s_w}{c_w} (2c_w^2 - 1) Z_\mu^0 A_\mu \phi^+ \phi^- - g^1 s^2 A_\mu A_\mu \phi^+ \phi^- - \bar{e}^\lambda (\gamma \partial + m_e^\lambda) e^\lambda - \bar{\nu}^\lambda \gamma \partial \nu^\lambda - \bar{u}_j^\lambda (\gamma \partial + m_u^\lambda) u_j^\lambda - \bar{d}_j^\lambda (\gamma \partial + m_d^\lambda) d_j^\lambda + ig s_w A_\mu [-(\bar{e}^\lambda \gamma^\mu e^\lambda) + \frac{2}{3}(\bar{u}_j^\lambda \gamma^\mu u_j^\lambda) - \frac{1}{3}(\bar{d}_j^\lambda \gamma^\mu d_j^\lambda)] + \frac{ig}{4c_w} Z_\mu^0 [(\bar{\nu}^\lambda \gamma^\mu (1 + \gamma^5) \nu^\lambda) + (\bar{e}^\lambda \gamma^\mu (4s_w^2 - 1 - \gamma^5) e^\lambda) + (\bar{u}_j^\lambda \gamma^\mu (\frac{4}{3}s_w^2 - 1 - \gamma^5) u_j^\lambda) + (\bar{d}_j^\lambda \gamma^\mu (1 - \frac{8}{3}s_w^2 - \gamma^5) d_j^\lambda)] + \frac{ig}{2\sqrt{2}} W_\mu^+ [(\bar{\nu}^\lambda \gamma^\mu (1 + \gamma^5) e^\lambda) + (\bar{u}_j^\lambda \gamma^\mu (1 + \gamma^5) C_{\lambda\kappa} d_\kappa^\mu)] + \frac{ig}{2\sqrt{2}} W_\mu^- [(\bar{e}^\lambda \gamma^\mu (1 + \gamma^5) \nu^\lambda) + (\bar{d}_j^\mu C_{\lambda\kappa}^\dagger \gamma^\mu (1 + \gamma^5) u_j^\lambda)] + \frac{ig}{2\sqrt{2}} \frac{m_\lambda^\lambda}{M} [-\phi^+ (\bar{\nu}^\lambda (1 - \gamma^5) e^\lambda) + \phi^- (\bar{e}^\lambda (1 + \gamma^5) \nu^\lambda)] - \frac{g}{2} \frac{m_\lambda^\lambda}{M} [H (\bar{e}^\lambda e^\lambda) + i\phi^0 (\bar{e}^\lambda \gamma^5 e^\lambda)] + \frac{ig}{2M\sqrt{2}} \phi^+ [-m_d^\mu (\bar{u}_j^\lambda C_{\lambda\kappa} (1 - \gamma^5) d_\kappa^\mu) + m_u^\lambda (\bar{u}_j^\lambda C_{\lambda\kappa} (1 + \gamma^5) d_\kappa^\mu) + \frac{ig}{2M\sqrt{2}} \phi^- [m_d^\mu (\bar{d}_j^\lambda C_{\lambda\kappa}^\dagger (1 + \gamma^5) u_j^\mu) - m_u^\mu (\bar{d}_j^\lambda C_{\lambda\kappa}^\dagger (1 - \gamma^5) u_j^\mu) - \frac{g}{2} \frac{m_\lambda^\lambda}{M} H (\bar{u}_j^\lambda u_j^\lambda) - \frac{g}{2} \frac{m_\lambda^\lambda}{M} H (\bar{d}_j^\lambda d_j^\lambda) + \frac{ig}{2} \frac{m_\lambda^\lambda}{M} \phi^0 (\bar{u}_j^\lambda \gamma^5 u_j^\lambda) - \frac{ig}{2} \frac{m_\lambda^\lambda}{M} \phi^0 (\bar{d}_j^\lambda \gamma^5 d_j^\lambda) + \bar{X}^+ (\partial^2 - M^2) X^+ + \bar{X}^- (\partial^2 - M^2) X^- + \bar{X}^0 (\partial^2 - \frac{M^2}{c_w^2}) X^0 + \bar{Y} \partial^2 Y + igc_w W_\mu^+ (\partial_\mu \bar{X}^0 X^- - \partial_\mu \bar{X}^- X^0) + ig s_w W_\mu^+ (\partial_\mu \bar{Y} X^- - \partial_\mu \bar{X}^+ Y) + igc_w W_\mu^- (\partial_\mu \bar{X}^- X^0 - \partial_\mu \bar{X}^0 X^+) + ig s_w W_\mu^- (\partial_\mu \bar{X}^- Y - \partial_\mu \bar{Y} X^+) + igc_w Z_\mu^0 (\partial_\mu \bar{X}^+ X^- - \partial_\mu \bar{X}^- X^+) + ig s_w A_\mu (\partial_\mu \bar{X}^+ X^- - \partial_\mu \bar{X}^- X^+) - \frac{1}{2}gM [\bar{X}^+ X^+ H + \bar{X}^- X^- H + \frac{1}{c_w} \bar{X}^0 X^0 H] + \frac{1-2c_w^2}{2c_w} igM [\bar{X}^+ X^0 \phi^+ - \bar{X}^- X^0 \phi^-] + \frac{1}{2c_w} igM [\bar{X}^0 X^- \phi^+ - \bar{X}^0 X^+ \phi^-] + igM s_w [\bar{X}^0 X^- \phi^+ - \bar{X}^0 X^+ \phi^-] + \frac{1}{2}igM [\bar{X}^+ X^+ \phi^0 - \bar{X}^- X^- \phi^0].$$

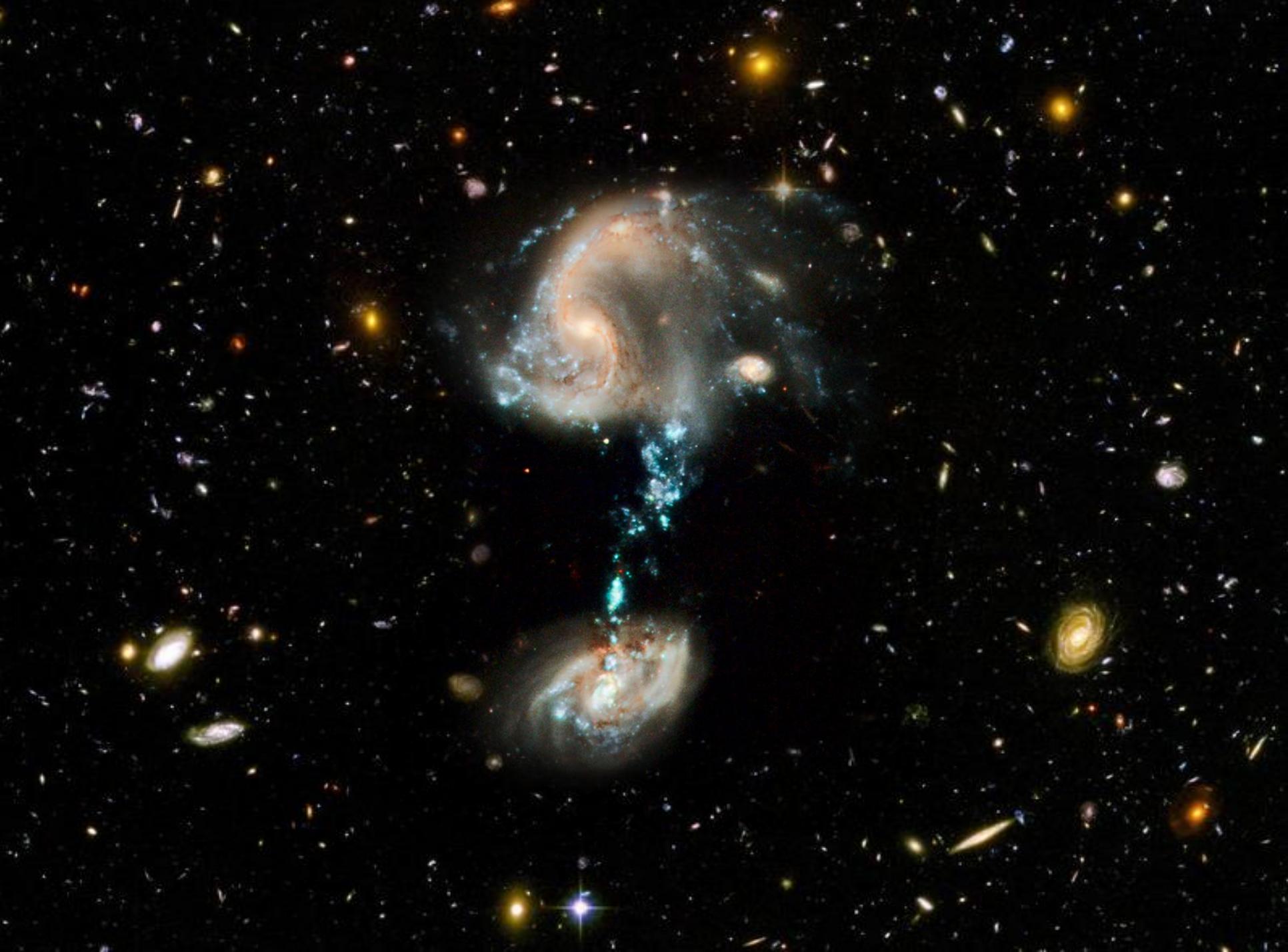
Lagrangiana del Modello Standard

(la descrizione di tutto quello che sappiamo sulle particelle!!!!)

“ La filosofia è scritta in questo grandissimo libro che continuamente ci sta aperto innanzi agli occhi (io dico l’universo), ma non si può intender se prima non si impara ad intenderne la lingua e conoscerne i caratteri nei quali è scritto. Egli è scritto in lingua matematica e i caratteri son triangoli, cerchi ed altre figure geometriche, senza i quali mezzi è impossibile a intenderne umanamente parola; senza questi è un aggirarsi vanamente per oscuro labirinto. ”

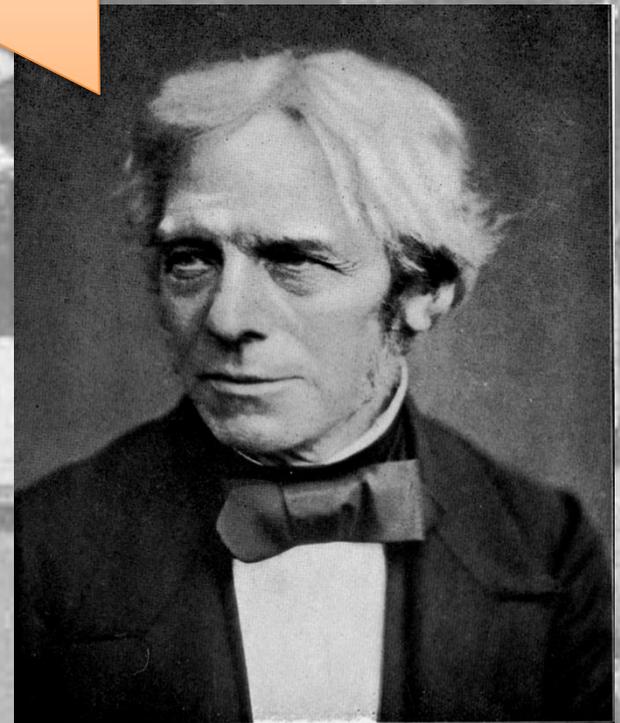
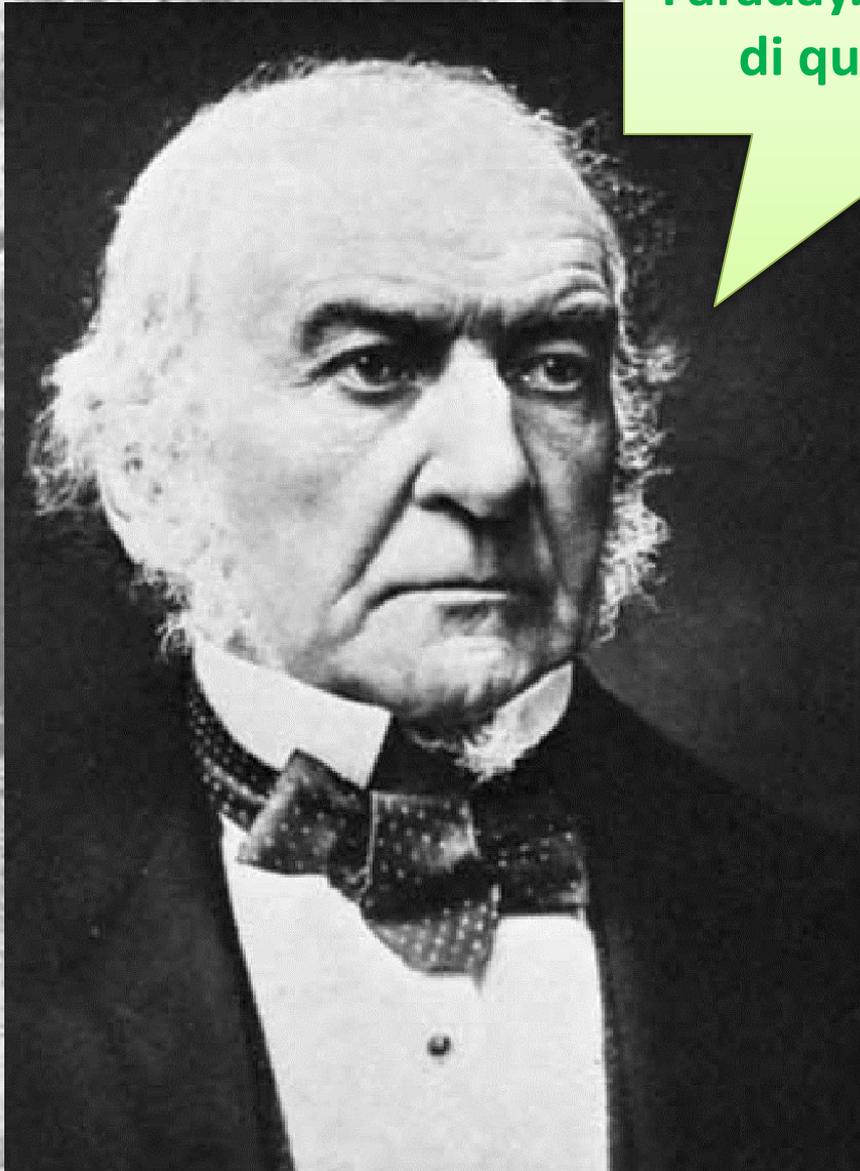
[Galileo Galilei]





**Molto interessante sig.
Faraday...ma...qual è l'utilità
di questa scoperta!?!?**

**Non lo so ancora...ma sono sicuro
che il governo ci metterà sopra
una tassa!!!**





£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867

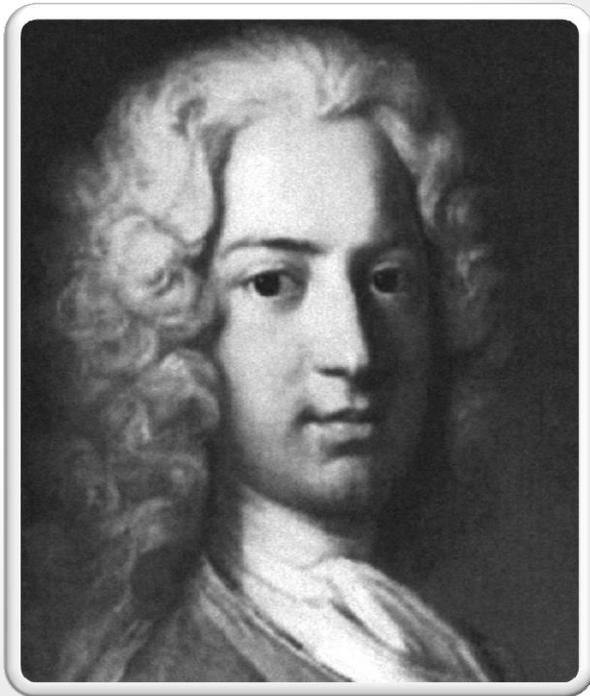
£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867

£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867

£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867

£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867

£20 BANK OF ENGLAND TWENTY POUNDS
Michael Faraday 1791-1867



Daniel Bernoulli (1700 - 1782)

Moto dei fluidi

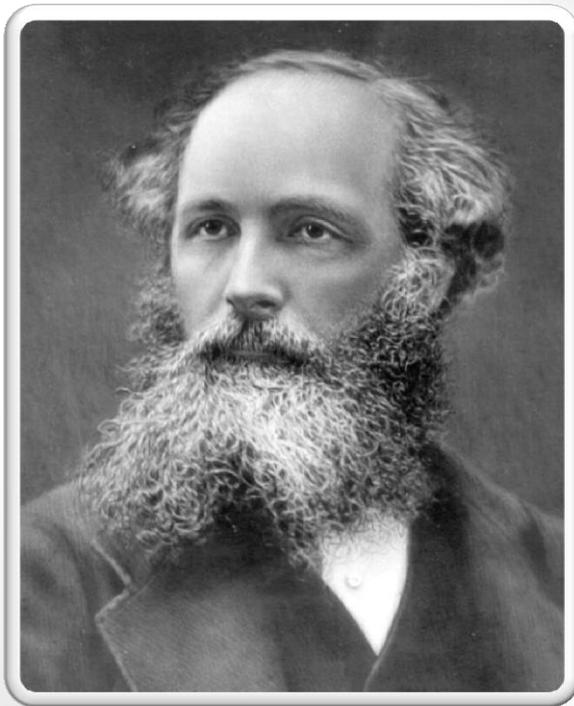
$$P + \rho gh + \frac{1}{2} \rho v^2 = K$$



James Clerk Maxwell (1831 - 1879)

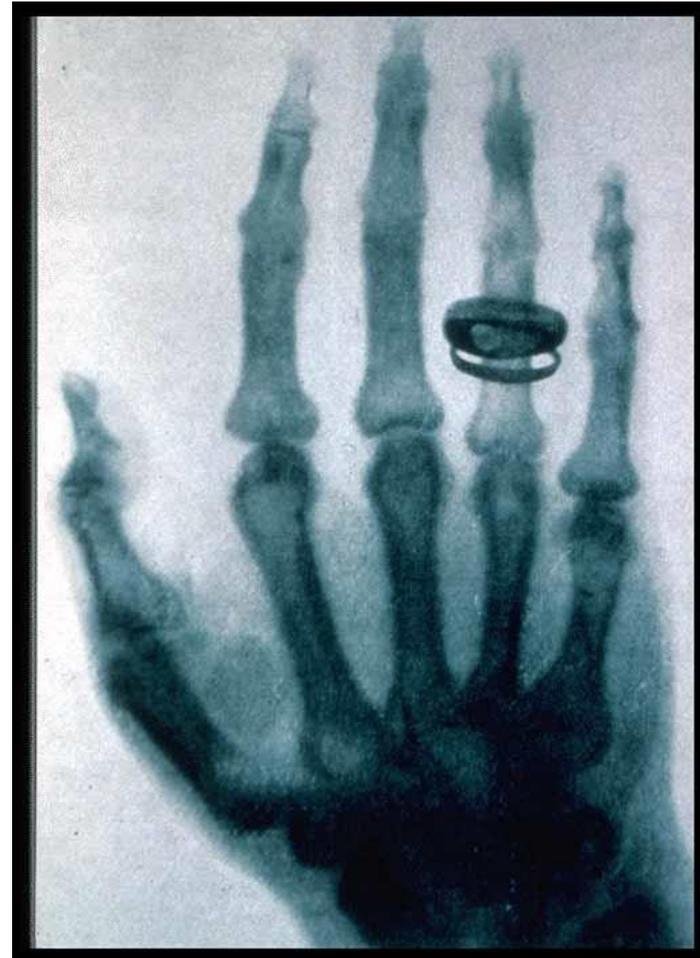
Campo elettromagnetico

$$\begin{aligned}\nabla \cdot E &= \frac{\rho}{\epsilon_0} & \nabla \times E &= -\frac{\partial B}{\partial t} \\ \nabla \cdot B &= 0 & \nabla \times B &= \mu_0 j + \mu_0 \epsilon_0 \frac{\partial E}{\partial t}\end{aligned}$$



Wihelm Röntgen (1845 - 1923)

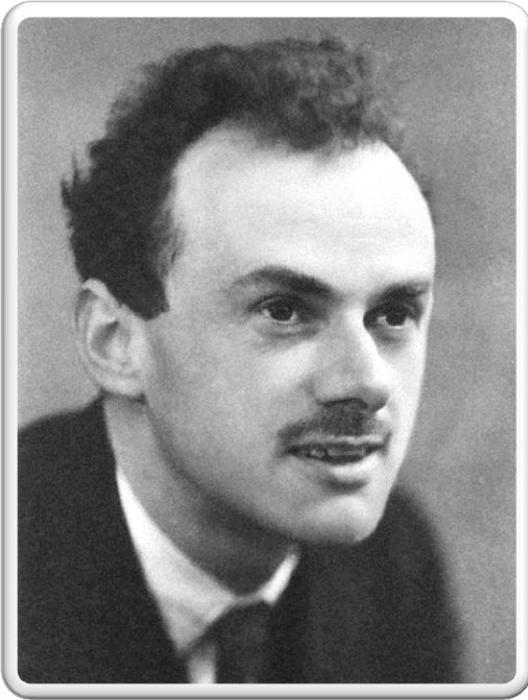
Raggi X



Paul Dirac (1902 - 1984)

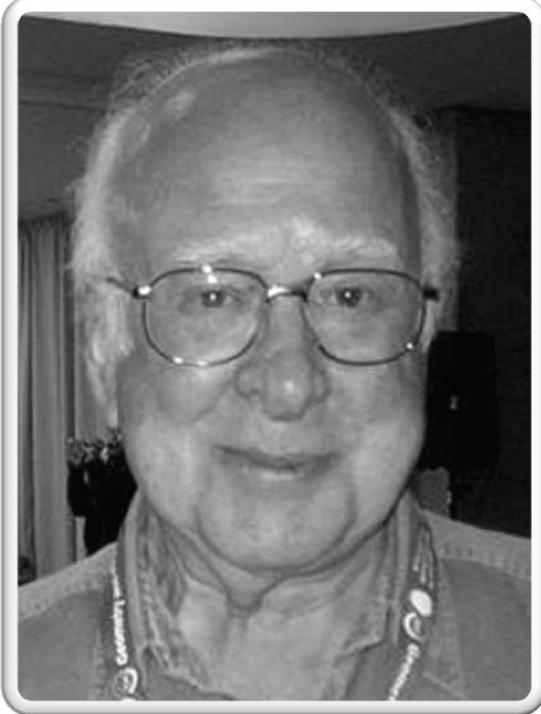
Antimateria

$$(i\gamma^\mu \partial_\mu - m) \psi = 0$$



Peter Higgs (1902 - oggi)

Meccanismo di Higgs





Nobody knows how
it can be like that!!

PERCHE' è così ?!?!





That's all Folks!
(not really)