

JMPRS Retreat 12nd - 15th October 2010

History of Particle Physics: the beginning

*by
Gabriele Surcis*

*"There is nothing new to be discovered
in Phisycs now. All that remains is
more and more precise measurement"*

*By William Thomson
or better known as
Lord Kelvin*

Somewhere in England 1900

The first idea

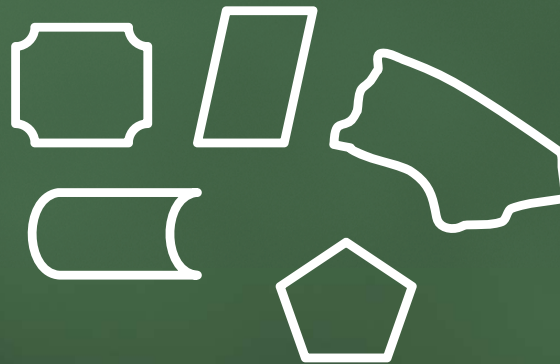
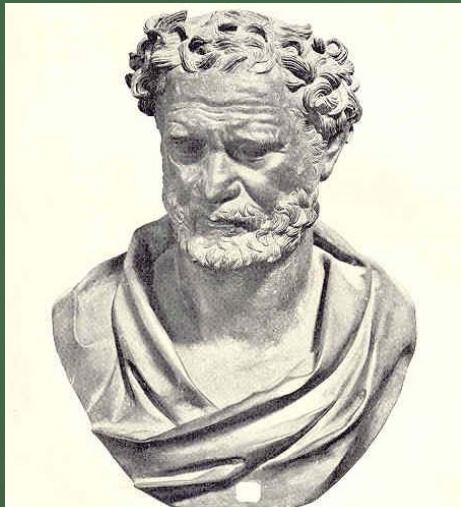


Everything is composed of
"atoms"



Democritus
460 BC – 370 BC

- physically indivisible
- indestructible
- always in motion



- different shapes &
sizes

The next ideas

When?



XIX Century !!!

1890

1900

1910

1920



e^-



p

1920

1930

1940

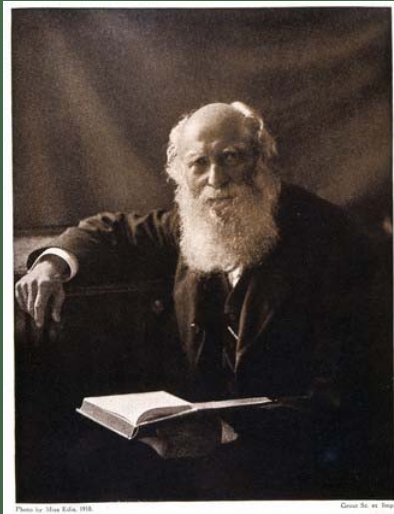
1950



n e^+

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1874 George Stoney



Irish physicist

→ *He introduced the concept
of the magnitude of the
"atom of electricity"*

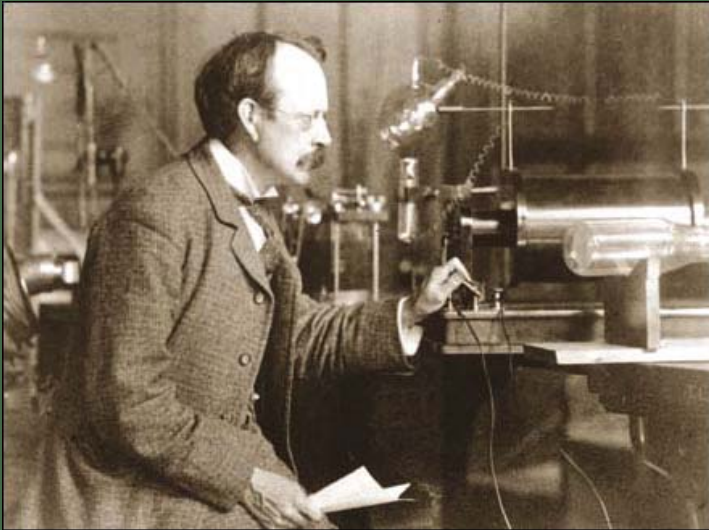


*He called it "electron"
 $e = 4.35 \times 10^{-21}$ Coulombs*

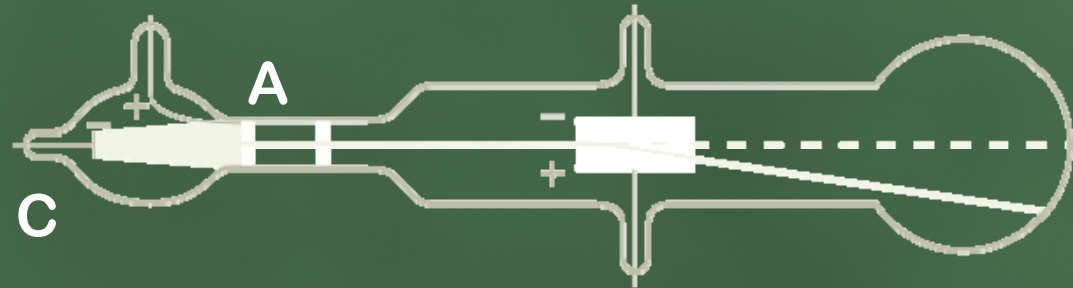
1898 Joseph J. Thomson



Physics 1906



*He discovered the
"electron"*



$$e/m = 1 \times 10^{11} \text{ C/Kg}$$

English physicist

His students: E. Rutherford



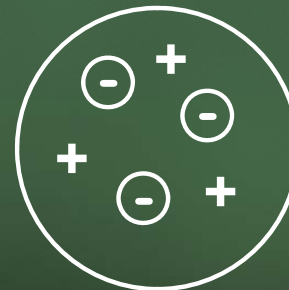
M. Born



W.H. Bragg



electron is 2000 lighter than H



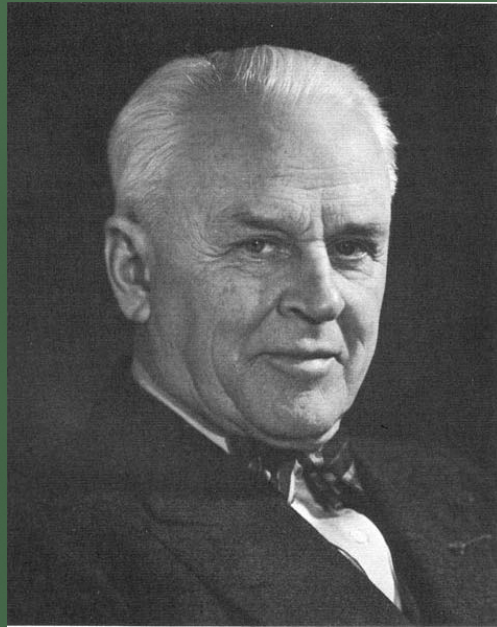
*"Plum pudding" model
of the atom*

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1909 Robert A. Millikan

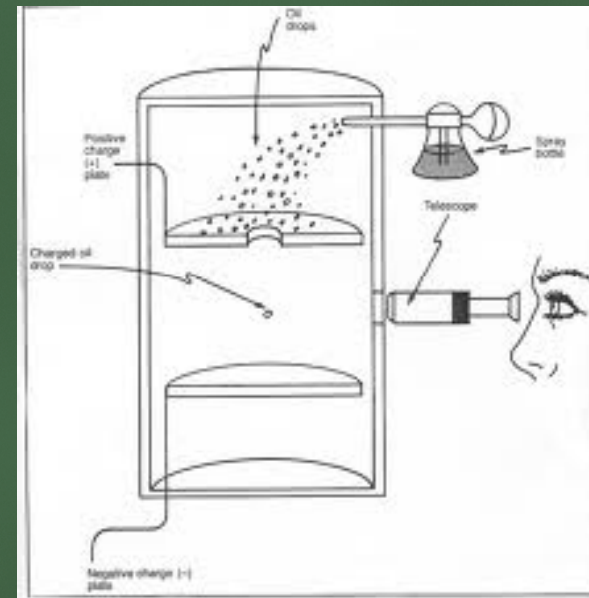


Physics 1923



He measured the charge of the electron

American physicist



$$e = 1.592 \times 10^{-19} \text{ Coulombs}$$

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1911 Ernest Rutherford

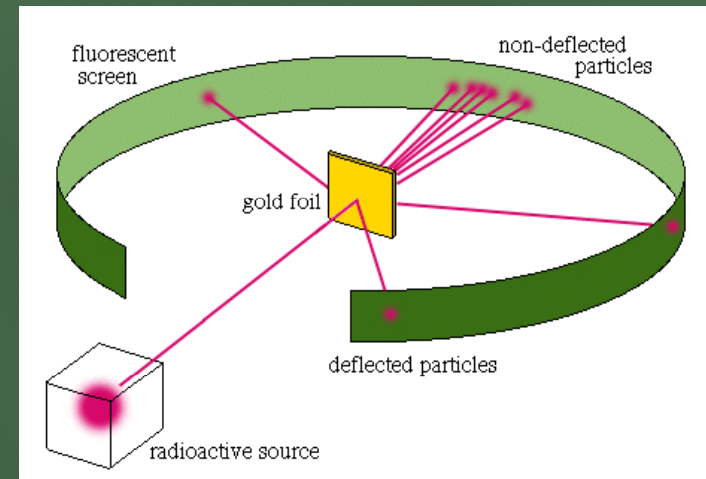


Chemistry 1908
(disintegration of elements)



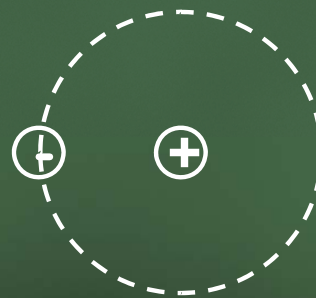
Small positive nucleus in atoms

with H. Geiger & E. Marsden



*New-Zealander
physicist*

*His students: R.W. Boyle
N. Bohr
J. Chadwick*



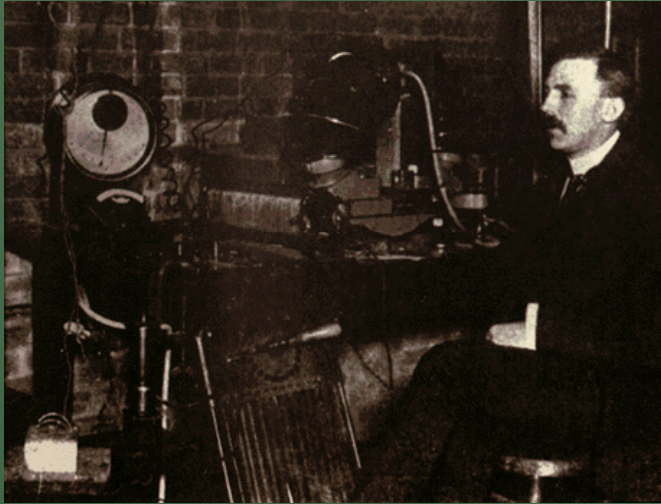
"Rutherford" model of the atom

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1919 Ernest Rutherford



*Chemistry 1908
(disintegration of elements)*



He detected the proton



*New-Zealander
physicist*

His students: R.W. Boyle

N. Bohr



J. Chadwick



*He theorized the existence
of "neutrons" as
"nuclear glue"*

*(while working with N. Bohr and
Chadwick)*

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1924-1928 Quantum mechanics



L. de Broglie  *Physics 1929*
French physicist



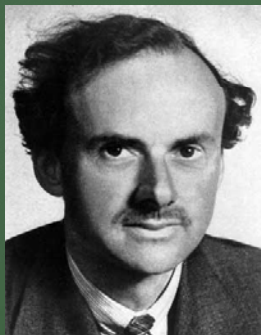
*Wave nature of
Electrons (1924)*



E. Schrödinger  *Physics 1933*
Austrian physicist



*Formulation of
Quantum mechanics
Theory (1926 & 1928)*



P. Dirac  *Physics 1933*
English physicist

1930 Wolfgang Pauli



*Physics 1945
(Exclusion Principle)*



*He introduced the
concept of "neutrino"*



*In order to explain the
continuous spectrum of
beta decay*

Austrian physicist

Sommerfeld & Born's student

1931 James Chadwick

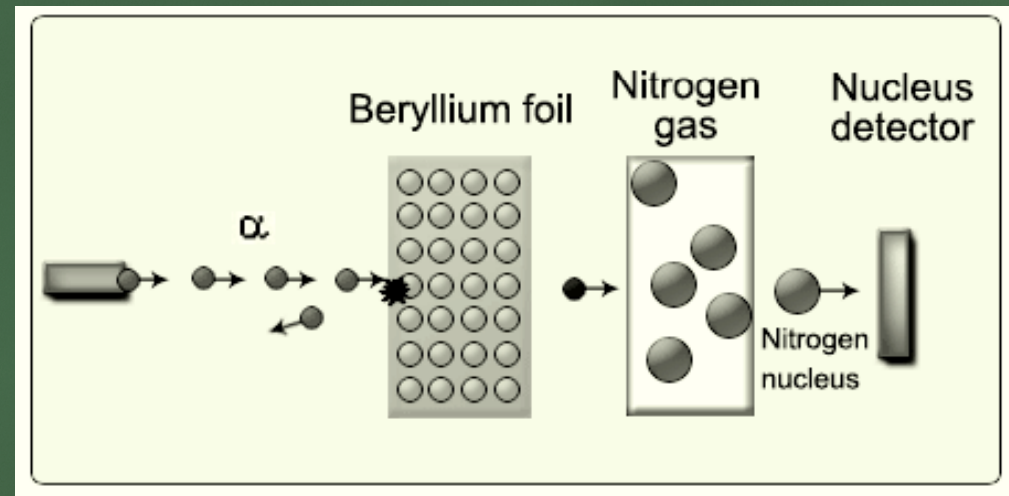


Physics 1935



*He discovered the
"neutron"*

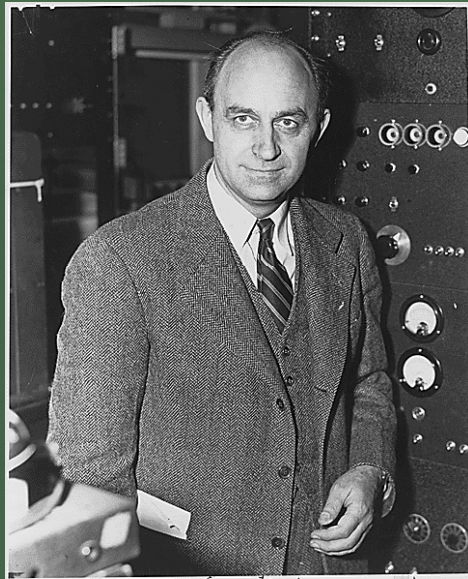
English physicist



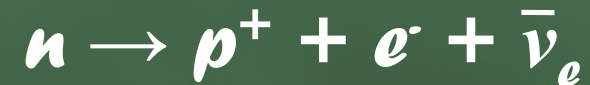
1931-34 Enrico Fermi



Physics 1938



*Beta decay theory by
using the neutrinos*



Italian physicist

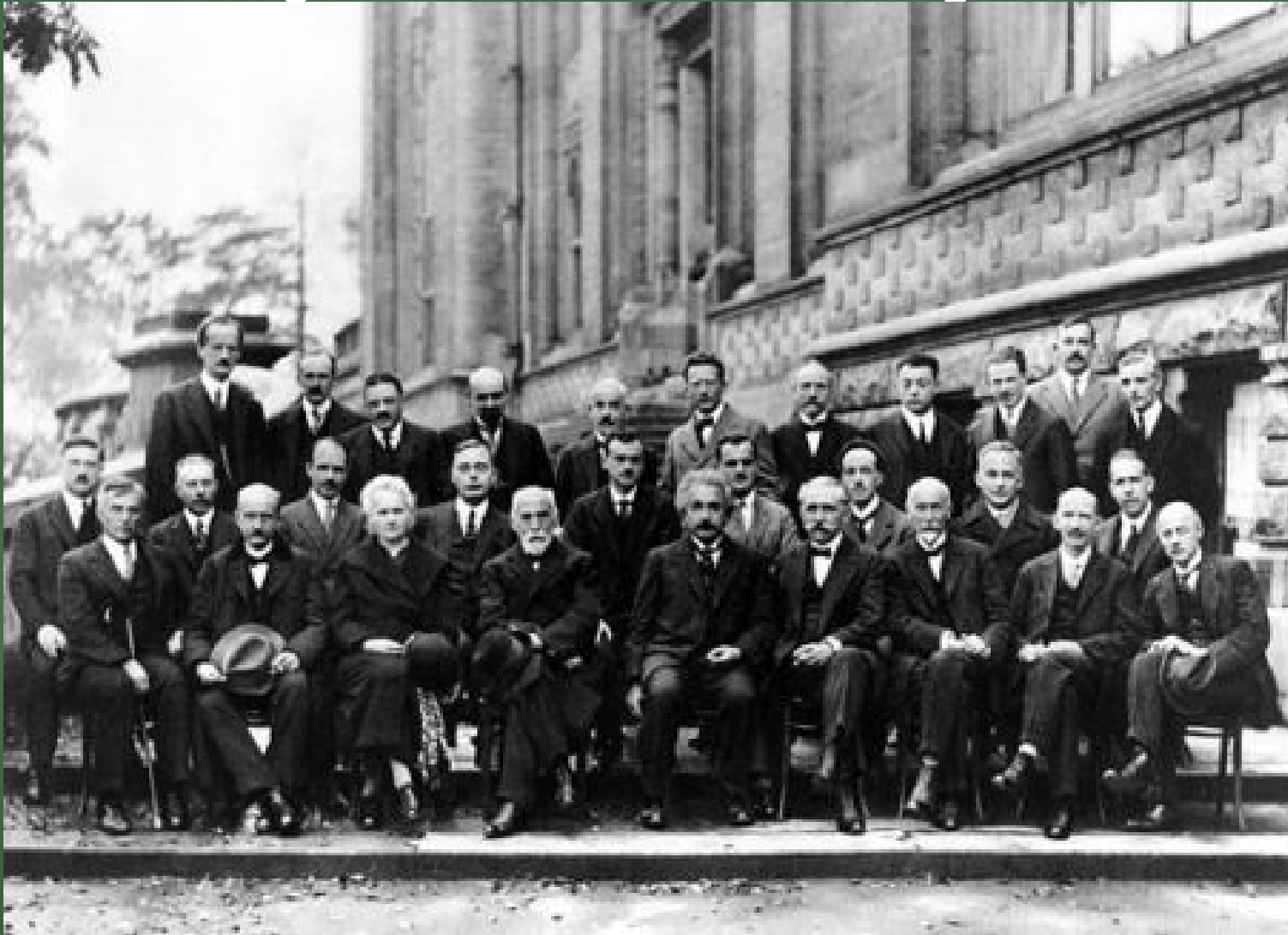
*His students: E. Amaldi
O. D'Agostino
E. Majorana
B. Pontecorvo
F. Rasetti
E. Segrè*



*Ragazzi di via Panisperna
(Via Panisperna Boys)*

Gabriele Surcis

Thanks to all of them



Gabriele Surcis