Nekaj zgodovine:

D. Mendeljejev, 1869: periodni sistem elementov

JJ. Thompson, 1897: odkritje elektrona (e-)

↓ študent

Ernest Rutherford, 1911:
Pojasni sestavo atoma z jedrom:

študenta

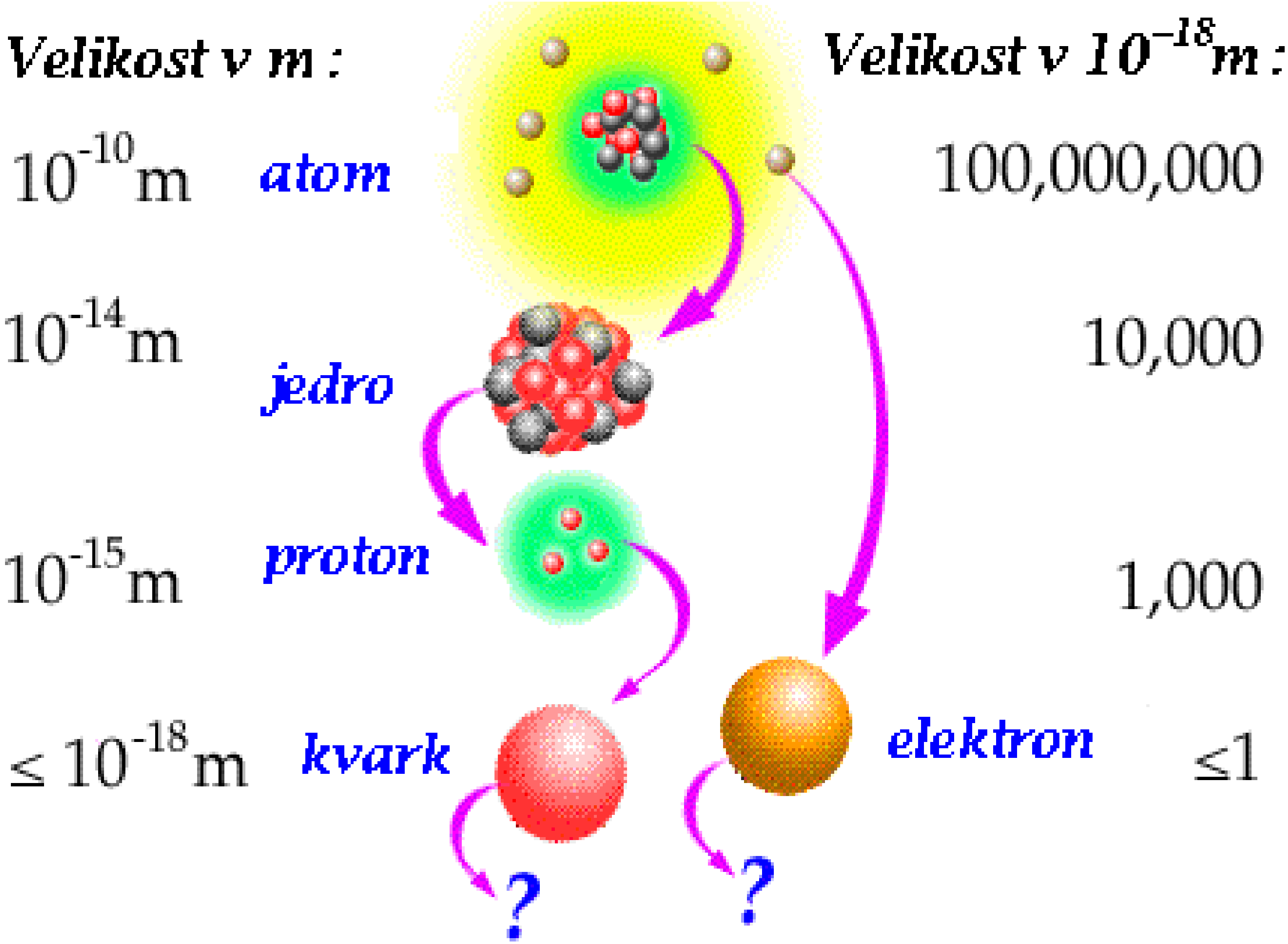
Geiger, Marsden: opravita eksperimentalno delo

Ernest Rutherford, 1911: ugotovi, da različna jedra vsebujejo jedra vodika, kar smatramo za odkritje protonov (p)
proton: grška beseda za "prvi", πρῶτον.

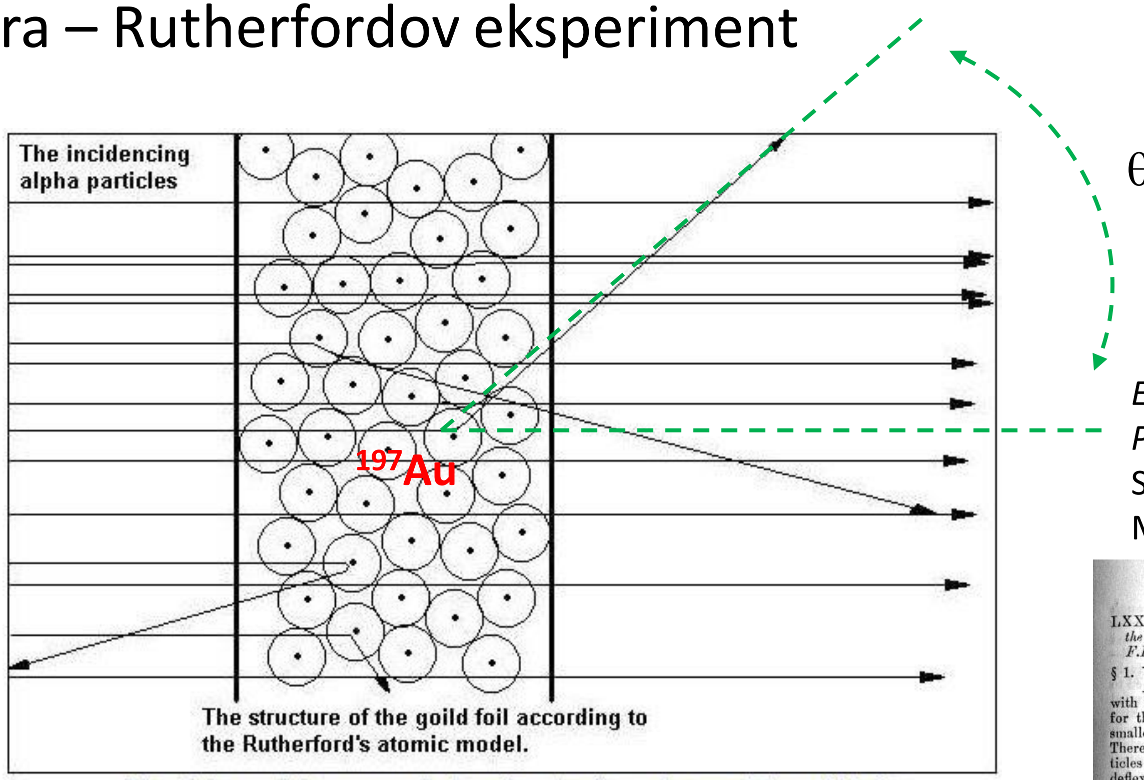
V tem laboratoriju 1932 J. Chadwich odkrije nevtrone (n)

E. Rutherford: "Znanost je fizika, vse ostalo je navadno zbiranje znamk."

Svet, kot ga vidimo dandanes:



Velikost jedra – Rutherfordov eksperiment



http://library.thinkquest.org/19662/low/eng/exp-rutherford.html

α delci
(He jedra)
iz ^{214}Po

E. Rutherford,
Philosophical Magazine
Series 6, vol. 21
May 1911, p. 669-688

$$\frac{dN_{He}^{sip}}{d\vartheta} \propto \frac{1}{\sin^4\left(\frac{\vartheta}{2}\right)}$$

za točkaste delce

[669]

LXXIX. *The Scattering of α and β Particles by Matter and the Structure of the Atom. By* Professor E. Rutherford, *F.R.S., University of Manchester* *.

§ 1. IT is well known that the α and β particles suffer deflexions from their rectilinear paths by encounters with atoms of matter. This scattering is far more marked for the β than for the α particle on account of the much smaller momentum and energy of the former particle. There seems to be no doubt that such swiftly moving particles pass through the atoms in their path, and that the deflexions observed are due to the strong electric field traversed within the atomic system. It has generally been supposed that the scattering of a pencil of α or β rays in passing through a thin plate of matter is the result of a multitude of small scatterings by the atoms of matter traversed. The observations, however, of Geiger and Marsden † on the scattering of α rays indicate that some of the α particles must suffer a deflexion of more than a right angle at a single encounter. They found, for example, that a small fraction of the incident α particles, about 1 in 20,000, were turned through an average angle of 90° in passing through a layer of gold-foil about ·00004 cm. thick, which was equivalent in stopping-power of the α particle to 1·6 millimetres of air. Geiger ‡ showed later that the most probable angle of deflexion for a pencil of α particles traversing a gold-foil of this thickness was about 0°·87. A simple calculation based on the theory of probability shows that the chance of an α particle being deflected through 90° is vanishingly small. In addition, it will be seen later that the distribution of the α particles for various angles of large deflexion does not follow the probability law to be expected if such large deflexions are made up of a large number of small deviations. It seems reasonable to suppose that the deflexion through a large angle is due to a single atomic encounter, for the chance of a second encounter of a kind to produce a large deflexion must in most cases be exceedingly small. A simple calculation shows that the atom must be a seat of an intense electric field in order to produce such a large deflexion at a single encounter.

Recently Sir J. J. Thomson § has put forward a theory to

* Communicated by the Author. A brief account of this paper was communicated to the Manchester Literary and Philosophical Society in February, 1911.

† Proc. Roy. Soc. lxxxii. p. 495 (1909).

‡ Proc. Roy. Soc. lxxxiii. p. 492 (1910).

§ Camb. Lit. & Phil. Soc. xv. pt. 5 (1910).

B. Hahn et al., Phys. Rev. 101, 1131 (1956)

e^-, E=183 MeV

P(θ)

$$2R\sin\beta_1 = \lambda_B$$

$$R = r_0 A^{1/3}$$

$$A^{1/3}\sin\beta_1 = \frac{\lambda_B}{2r_0} = konst.$$

$$r_0 \sim \frac{\lambda_B}{2A^{1/3}\sin\beta_1} \sim 1{,}6\, fm$$