ROSSI'S REACTOR THEORY AND ITS BASIC PARAMETRS CALCULATION

V.B. Scherbatskiy, V.M. Kormyshev, UrFU, Ekaterinburg, RU
(vbsh45@mail.ru)

The situation with the new energy source [1] developed by the Italian physicists mainly is similar to the situation with HTSP (high temperature superconductors): there is the effect, but there are no phenomenon physical mechanism explanation and adequate theory.

A. Rossi's reactor theory suggested is based on the developed electron-quark analogy method and multielectron theory [2, 3]. The method difference is availability of a color charge in electrons analogous to the color charge of quarks in quantum chromodynamics (QCD). The reactor basic parameters calculation was performed with the help of specially developed Software Package (SP). The calculation algorithm is following.

1. The balance equation for centrifugal and coulomb Yukawa potential:

$$f(r) := -\frac{Cu\ \mathbf{e}^{\left(-\frac{r}{Ru}\right)}}{r} + \frac{M}{r^2} + \frac{q^2}{r} \quad (1).$$

2. The derivative equation (1):

$$f1(r) := \frac{Cu\ \mathbf{e}^{\left(-\frac{r}{Ru}\right)}}{r^2} + \frac{Cu\ \mathbf{e}^{\left(-\frac{r}{Ru}\right)}}{r\ Ru} - \frac{2\ M}{r^3} - \frac{q^2}{r^2}.$$

3. The thin structure constant:

```
alpha:=.007297352533;
```
$\alpha := .007297352533$.

4. The Rydberg constant:

```
Ry:=27.19492787;
```
$Ry := 27.19492787$

5. The Bohr radius, cm:

```
Rb:=5.29177E-09;
```
$Rb := .529177\ 10^{-8}$

6. The QCD constant for two-color electron-gluon chromoplasm (a square of the Planck charge):

```
Nconst:=8*PI/(22-2*2)/alpha;
```
$Nconst := 191.3383723$.

```
Cu:=Nconst/ln((2*alpha)^2/alpha^2);
```
$Cu := 138.0214604$

7. The Yukawa radius = the Compton radius R_{compt}, u (atomic mass unit):

```
Ru:=alpha;.
```
$Ru := .007297352533$

8. Multiparticle (me) angular momentum in chromoplasm is appeared when vibrations and a scattering of electrons e^- on their common centre is occurred (in the color field of a non-coulomb type!) ($L=R_{compt}\cdot m_{me}\cdot c$, m_{me} – reduced mass, R_{compt} – sighting parameter, c – speed;
$M = L^2/2m_{me}$), the mean value for 2..4e^-, in fractions ħ:

```
M:=.18;
```
$M := .18$.

9. The coulomb charge definition example of the multipaticle, created from two electrons e^-, taking into account the quark ratio (2/3)-(1/3) ($q=q_{me}^2$, in fractions e):

```
q:=.25;
```
$q := .25$

10. The multiparticle classical radius calculation example, u:

```
Minr:=fsolve(Ry*(Cu/r^2*exp(-r/Ru)+Cu/r/Ru*exp(-r/Ru)-2*M/r^3-
q^2/(r)^2)=0,r,0..1/120);
```
$Minr := .002764225971$

11. The same, cm:

```
Rme1:=Minr*Rb;
```
$Rme1 := .1462764807\ 10^{-10}$

12. The multiparticle binding energy calculation example, eV:

```
Esv:=Ry*(-Cu/Minr*exp(-Minr/Ru)+M/Minr^2+q^2/(Minr));
```
$Esv := -288463.4552$

13. The equation for the interaction potential (1):

$$f(r) := -3753.483660\ \frac{e^{(-137.0359998\ r)}}{r} + \frac{4.895087017}{r^2} + \frac{1.699682992}{r}$$

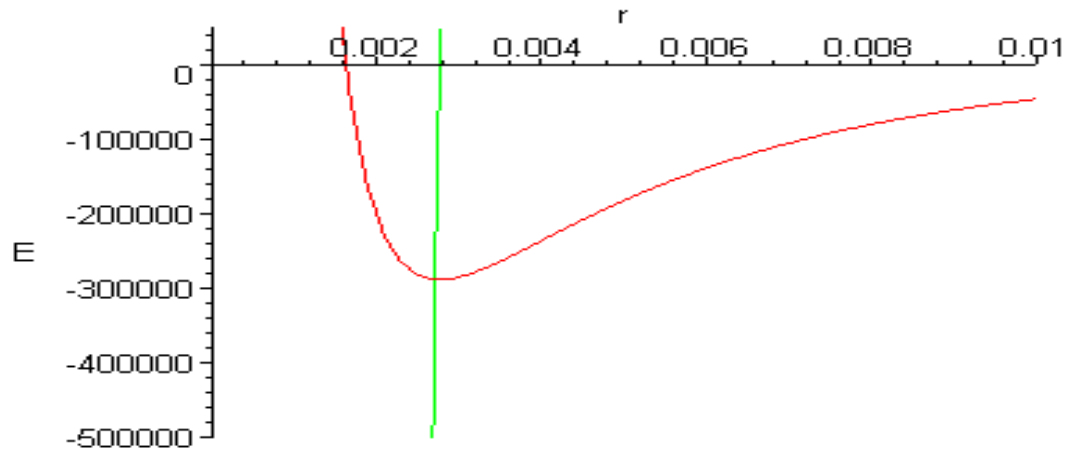

Figure. The multiparticle binding energy definition

The result received clearly demonstrates the electrons bound state possibility in me with the help of gluons (glueballs) in the two-color electron-gluon chromoplasm.

In Rossi's reactor the multiparticle is created by the color interaction of molecular hydrogen H_2 electrons and Ni crystal lattice atoms valence electrons. Multiparticle binding energy is E = 288,5 keV. In the case of its dissociation, this energy is converted into radiation. When Rossi's reactor worked in the test mode gamma radiation energy had been measured ~ 300 keV. An error in the calculation is:

δ= (300-288,5)/300*100= 3,8%.

Consequently, the error value received witnesses the adequacy of the mechanism considered and experimental data theory.

The multiparticle me has angular momentum which is …~½ħ and presented as the spin analog in the present case. The multiparticle has fermion properties, so the bound state between me and protons is possible with creation of multiatoms H and multimolecules H_2 (analogue hydrinos).

Multihydrogen behaviour in the solid is similar to one in superconductors of Cooper pairs having a neutral charge. The last one differing from a Wigner structure of superconductors provides high penetration capability of multimolecules H_2 and their active interaction with crystal lattice atoms nuclei.

The multimolecule size is $2R_{me}=0{,}292\cdot10^{-10}$ cm, which corresponds to the muonic mesoatom one ($R_\mu = 0{,}256\cdot10^{-10}$ cm).

Muon-catalyzed fusion was well examined [4], so other Rossi's reactor parameters definition (probability, section, Threshold energy, energy output etc) is a trivial task which performed by known methods and therefore not considered here. In multielectron catalysis in Rossi's reactor as in muon-catalyzed fusion the next requirements and criteria are implemented:

- the Coulomb barrier passage possibility;
- the sufficient section of nuclear processes;
- the sufficient possibility of interparticle collision;

The theory created and PC provide the optimal choice of physicochemical catalyst properties and reactor sizes for different capacity specified.

References:

1. http://www.journal-of-nuclear-physics.com/
2. United science journal (USJ), Num 17, 2007, p. 48.
3. http://viktor19451.narod.ru/
4. Ratis Yu.L. Manageable thermonuclear reaction or cold synthesis? The drama of ideas. Samara. Samara scientific centre of the Russian academy of sciences, 2009, p. 92.