# **Predictions of High Energy Experimental Results**

The predictions rely on the Regular Charge-Monopole Theory (RCMT) [1].

## I. No Higgs

It is proved that that Klein-Gordon equation is not valid [1]. An analogous proof shows that also the Higgs equation contains fundamental errors [1]. **Prediction 1:** A genuine Higgs boson will not be found. **Schedule**: LHC should confirm or deny this prediction until 2013-14 (according to CERN's March 2010 published plan).

#### Remarks on CERN's Higgs Declaration (January 2015)

It turns out that the CERN people have declared the Higgs detection. This declaration is questionable because it is impossible to have a genuine particle that is based on a mathematically erroneous theory. Moreover, a not very small number of CERN's LHC experts have used the Standard Model for a calculation of the Higgs boson width [9]. It turns out that the experimental LHC width is about 1000 times greater than the theoretical value predicted for a 125 GeV Higgs boson. A hindsight attempt to explain this huge discrepancy as a property of the LHC machine is certainly not as good as a successful prediction of such a property. Furthermore, this argument says that the width prediction of the LHC people is analogous to a proposal to use a thermometer that measures temperature with an error of 1 <sup>o</sup>C as an element of a very important experiment that requires an accuracy of 0.001 <sup>o</sup>C. It is very hard to believe that the above mentioned CERN team of experts can really do such an unscientific work.

### II. Proton-Proton cross section

The first problem to be discussed here is the specific structure of the baryonic closed shells of quarks. One may expect that the situation takes the simplest case and that the core's closed shells consist of just two *u* quarks and two *d* quarks that occupy an *S* shell. The other extreme is the case where the baryon is analogous to a very heavy atom and the baryonic core contains *many* closed shells of quarks. The presently known proton-proton (p-p) cross section data which is depicted in fig. 1, is used for describing the relevance of the LHC future data to the problem of how the closed shell structure affects the elastic p-p cross section.



Fig. 1: The solid line describes the proton-proton elastic cross section. The broken line describes the total cross section. Axes are drawn in a logarithmic scale.

**Prediction 2:** The elastic cross section graph will pass near E (for many inner closed shells) or near D (for very few inner closed shells) [2]. **Schedule:** Depends on the LHC performance.

# III. Pion-Pion cross section

Unlike protons, pions are characterized by a pair of quark-antiquark and they do not have inner quark shells. Moreover, in deep inelastic electron-proton cross section, the electron collides with one quark at a time. This property should also hold for quark-quark interaction of the pion-pion collision. Therefore, relying on RCMT, the pion-pion elastic cross section is analogous to an ordinary electromagnetic elastic cross section of charges. It is well known that this cross section decreases.

**Prediction 3**: Unlike the proton case, where the elastic cross section *increases* for collision energy greater than that of point C, a *decrease* of the elastic cross section is predicted for pion-pion scattering, and its graph will not increase at any stage.

Schedule: Unknown.

### IV. Pion momentum carried by quarks

The deep inelastic electron-proton scattering data are used for calculating the portion of the proton's momentum carried by quarks, as seen in a frame where the proton's momentum is very very large. It turns out that for a proton, the overall quarks' portion is about one half of the total momentum. The fact that baryons have a core is the reason for this effect.

**Prediction 4:** Unlike the proton case, it is predicted that an analogous experiment of deep inelastic electron-pion scattering will prove that in this case the pion's quarks carry all (or nearly all) the pion's momentum [3]. **Schedule:** Unknown.

# V. Charge Radius of the Sigma Plus Baryon

There is an analogy between electromagnetic bound states of electrons in an atom and quark bound states in a baryon. This analogy may be used for finding an estimate of physical values pertaining to baryonic structure.

**Prediction 5:** Phenomenological calculations based on RCMT and on the experimentally known charge radius of some particles, yield the following estimate for the square of the charge radius of the Sigma Plus baryon and for the charge radius itself [4]. The estimates fall in the following ranges:

<r^2> = 0.88 - 1.16 fm^2

<r> = 0.94 – 1.08 fm

These values are greater than the recently published QCD based estimates [5].

Schedule: Unknown.

#### VI. Pentaquarks, Strange Quark Matter, and Glue Balls

Several decades age, claims concerning the existence of Pentaquarks, SQM, and Glue Balls have been published by QCD supporters. RCMT clearly contradicts the existence of these objects. No specific article was published by Comay which claims that these objects will not be found [6]. During the nineties Comay offered bets to physicists who were building an experimental device aiming to find Pentaquarks (and one of them has indeed lost this bet...)

**Prediction 6:** Like results of earlier searches, the existence of Pentaquarks, SQM and Glue Balls will not be established.

Schedule: These kinds of experiments continue.

### VII. Dirac Monopoles will not be Detected

The Dirac monopole search is based on its supposed direct interaction with charge. The RCMT proves that there is no such interaction.

**Prediction 7:** Like results of earlier searches, the existence of a Dirac monopole will not be established [7]. (This prediction has been made 25 years ago.)

Schedule: Search for monopoles continues [8].

References:

- [1] E. comay, Prog. In Phys. **4**, 91 (2009) and references therein. http://www.tau.ac.il/~elicomay/MathPhys.pdf
- [2] E. Comay, Prog. In Phys. **2**, 56 (2010). http://www.tau.ac.il/~elicomay/protonsc2.pdf

[3] In RCMT, baryons have a core that attracts the 3 valence quarks. The core carries momentum. Mesons are bound states of quark-antiquark which do not have a core. Hence, in mesons, quarks are practically assumed to carry all the momentum.

[4] A paper is under preparation.

[5] P. Wang, D. B. Leinweber, A. W. Thomas and R. D. Young, Phys. Rev. **D 79**, 094001 (2009).

[6] The force between hadrons is a residual force, like the force between nucleons. Therefore, strongly bound states of pentaquarks do not exist. The same is true for SQM. Gluons do not exist. A fortiori, Glue Balls do not exist.

[7] E. Comay, Lett. Nuovo Cimento, 43, 150 (1985).

[8] A monopole search is planned to be carried out at the LHC. See http://cdsweb.cern.ch/record/1243082/

[9] S. Dittmaier, C. Mariotti, G. Passarino, R and Tanaka Editors:, CERN–2011–002, 17 February 2011. (See pp. 142-146.)