Journal of Advanced Physics
Vol. 5, pp. 84–89, 2016
(www.aspbs.com/jap)

ARTICLE

Deformed Space-Time Reactions: Towards Nuclear Metabarysis

Gianni Albertini[1,*] and Riccardo Capotosto[2]

[1] *Università Politecnica delle Marche (UNIVPM), and CNISM (Consorzio Nazionale Interuniversitario per le Scienze fisiche della Materia), Ancona Unit, via Brecce Bianche, 60131 Ancona, Italy*
[2] *Via Poggetto 15a, 01027 Montefiascone, Viterbo, Italy*

Experimental evidence of non-conventional reactions, which were collected in these last years, can be all justified in the framework of a general theory that predicts local variations of the space-time metrics. These deformations are different for the different fundamental interactions and for different stored energy and are connected to a violation of the Lorentz Local Invariance.

KEYWORDS: Local Lorentz Invariance Breakdown, Deformed Space-Time, Neutron Emission, Ultrasounds, Changes of Atomic Weight, Nuclear Metabarysis.

1. INTRODUCTION

Low Energy Nuclear Reactions (LENR) or Condensed Matter Nuclear Science (CMNS)[1,2] on one side and Deformed Space time reactions (DST-reactions)[3–5] on the other side share the same evidence: nuclear reactions can occur which are not predicted by the to-day commonly accepted theory.

Although different experimental set-ups and systems, besides different theoretical approaches, are used, it was proposed[6] that the results obtained in both investigation fields are each other compatible.

In order to gather all the experimental evidences in a unifying theoretical framework, the present paper puts in evidence those characteristics that identify a process as a result of an underlying DST-reaction. To this aim, fundamental principles of the Deformed Space-Time theory (DST-theory) are given first, some of the investigated DST-reactions are then shortly described; finally the peculiar characteristics of DST-reactions are put in evidence and are also found in the LENR/CMNS experiments.

2. DST-THEORY

According to General Relativity, the gravitational interaction corresponds to a curvature of space-time. A local Lorentz frame is associated, as a tangent space, to each point of the globally Riemannian space.

In analogy and as a completion to this theory, DST-theory predicts that all the interactions can change the four-dimensional metric parameters, thus introducing a deformation of space-time. The corresponding mathematical structure is also able to generate spaces endowed with curvature.[7]

*Author to whom correspondence should be addressed.
Email: g.albertini@univpm.it
Received: 21 December 2014
Accepted: 20 March 2015

In particular, the geometry of a four-dimensional variety attached at a point $x[x = (x_0, x_1, x_2, x_3) = (ct, x, y, z)$, where c is the usual light speed in vacuum] of the standard Minkowski space-time is characterized by a generalized interval ds^2:

$$ds^2 \equiv b_0^2 c^2 dt^2 - b_1^2 dx_1^2 - b_2^2 dx_2^2 - b_3^2 dx_3^2$$

The metric parameters b_i, noticeably, are functions of the energy E of the process. Energy thus plays the double role of variable of the process and variable of the metric. This way, the space-time structure is strongly related to the process occurring in it and the Finzi Principle of Solidarity,[8] which was enunciated for General Relativity, finds a more general application in this case. In fact, the Solidarity Principle states that not only space-time properties affect phenomena, but also phenomena reciprocally affect space-time properties.

The functions $b_i(E)$ are different for the different interactions and they were evaluated, when it was possible, starting from the experimental data. In particular, the lifetimes of the pure leptonic decay of the meson K_0 short[9–11] were used to obtain the metric parameters of the weak nuclear interaction:

$=> b_0^2 = 1;$
$=> b_1^2 = b_2^2 = b_3^2 = b^2$
where:
$b^2 = 1$ if $E \geq E_{0\text{weak}} = 80.4 \pm 0.2$ GeV
$b^2 = (E/E_{0\text{weak}})^{1/3}$ if $E < E_{0\text{weak}}$

 2168-1996/2016/5/084/006 doi:10.1166/jap.2016.1240