

Deformed Space-Time Reactions and Their Phenomenology

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Abstract

Investigations of Piezo-nuclear reactions, Low Energy Nuclear Reactions or Condensed Matter Nuclear Science and E-cat are different ways leading to reactions supposed of nuclear nature, which are not easy to describe in terms of the commonly accepted theories. They are analysed by considering four main phenomenological characteristics: occurrence of an energy threshold; change of atomic weight; absence of gamma radiation and anisotropic emission of nuclear particles in intense beams having very short life span. These characteristics qualify them as consequences of reactions supposed to occur in regions of deformed Space-Time. This paper unifies all the observed phenomena into a unique general phenomenology, corresponding to the predictions of the Deformed Space Time theory. This theory is shortly introduced and is shown to apply not only to the nuclear interactions but also to the other known fundamental interactions.

Keywords

Deformed Space-Time Reactions, Cold Fusion, Low Energy Nuclear Reactions (LENRs), Condensed Matter Nuclear Science, Piezo-Nuclear Reactions, Energy Catalyzer (E-cat)

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1. Introduction

Non-conventional nuclear reactions were obtained in the last twenty years by treading different ways either using different experimental methods or basing on different phenomenology-based assumptions and expectations. New names were coined in order to indicate that not-predicted effects were observed: Cold Fusion (CF), Low Energy Nuclear Reactions (LENRs), Condensed Matter Nuclear Science (CMNS) Piezo-Nuclear Reactions (PNR) and finally Energy Catalyzer (E-cat).

A careful analysis shows that each of these terms is ambiguous. In fact, “cold fusion” can also indicate the nuclear fusion to be obtained by mu-mesic atoms [1]; the locution “Low Energy Nuclear Reactions” could also be attributed to the Uranium fission, as no further energy input

is required when the critical mass is reached; the study of slow neutrons inducing Uranium fission could be indicated as “Condensed Matter Nuclear Science”; the same “Piezo-nuclear Reactions” can indicate not-exotic events if the mechanical energy supplied in a large volume can be confined in a small volume, thus attaining an energy density able to induce nuclear reactions: this could be the case of the ultrasound-induced sonication, if the energy of a micrometric bubble can be concentrated into an atomic volume, as it was suggested [2] or fusion obtained by mechanical adiabatic compression of a dense plasma [3]; “Energy Catalyser”, on his count, is such a generic definition that can also be attributed to any catalytic agent inducing exothermic reactions.

This paper aims to analyse the behaviour that makes these anomalous effects different from the traditional ones, to

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