ATOMIC ENGINEERING: A NEW APPROACH

A.M. Spasic[1], M.D. Babic[1], M.M. Marinko[1], N.N. Djokovic[1], D.N. Krstic[2], M. Mitrovic[2]

[1]*Institute of Technology of Nuclear and other Mineral* Raw Materials, Belgrade, Serbia, 86 F. d'Esperey St., P.O. Box 390, 11000 Belgrade, Serbia, Yugoslavia; Tel: +381 11 3691 586; Fax: +381 11 3691 583;e-mail a.spasic@itnms.ac.yu; [2]Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

Atomic Engineering! What it could be? The first and/or ancient idea remind on some particles that are small, indivisible, integer (Greek "ατομοζ") and their interplay. In a recent scientific literature such titles as Nanoscience and Nanotechnology, Functional Artificial Nanoarchitectures, Nanosystems, Molecular Machinery becomes viable, although not so long ago they have been considered futuristic and not promising. This presentation intends to introduce inevitable deeper step based on entities and to predict the eventual existence of their further structure. An entity can be defined as the smallest indivisible element of matter that is related to the particular transfer phenomena. A possible approach is proposed to the general formulation of the links between the basic characteristics, levels of approximation, and levels of abstraction related to the existence of fine (micro, nano, atto) dispersed systems/**DS**, Table 1. At first, for the reason of simpler and easier physical and mathematical modeling, it is convenient to introduce the terms: homo-aggregate (phases in the same state of aggregation/**HOA**) and hetero-aggregate (phases in a more than one state of aggregation/**HEA**). This is a new classification of the fine dispersed systems, which are consisted of the groups of one kind of entities or various kinds of entities. Hence, the entity can be either differential element of mass/demon, ion, phonon as quanta of acoustic energy, infon as quanta of information, photon, and electron. Figure 1 a) shows a stereographic projection/mapping from Riemman sphere, i.e., "hierarchy" of entities fig. 1 b), which have to be understood as a lim value of the ratio u_0/Z (withdrawn from magnetic Reynolds criteria $Re_m = 4\pi lGu_0/c^2$; where the conductivity G is expressed as a reciprocal of viscosity/impedance Z, $G = 1/Z$, l is the path length that an entity "override", u_0 is the characteristic velocity, and c is the velocity of light). In general S corresponds to the slow system/super fluid and F correspond to the fast system/superconductor; now, it is possible to propose that all real dynamic systems are situated between these limits. Also, it seems sensible to think about the further structure of entities, e.g., the basic entity can be understood as an energetic ellipsoid shown in figure 1 c) (based on the model of electron following Maxwell-Dirac Isomorphism/MDI: electron is an entity at the same time quantum-mechanical/microscopic N = - 2 and electrodynamic/ macroscopic N=3). Now, spatio-temporal, five dimensional existence of an entity/e.g., electron may be presented by equation $[(x-a)^2 + (y-b)^2 + (z-d)^2 - (ct-e)^2 - (^kN_0\omega_N-f)^2 = 0]$, where $^kN_0$ is the factor of spatio-temporal synergy (cm s), and ω_N is isotropic angle rotation (s^{-1}). This energetic ellipsoid can degenerate into the energetic sphere, and e.g., Koruga have withdrawn some interesting remarks related to the five dimensional reality and needs of its further/deeper studies.

Table 1. $(DS)^{ij} = HOA\delta^{ij} + HEA\tau^{ij}$

D.P.D.M.*	GAS	LIQUID	SOLID
GAS	**PLASMA**	**FOAM**	**METAL**
LIQUID	**FSOL/fog**	**EMULSION**	**LIVE CELL**
SOLID	**FSOL/smoke**	**SUSPENSION**	**DISPERSOID**

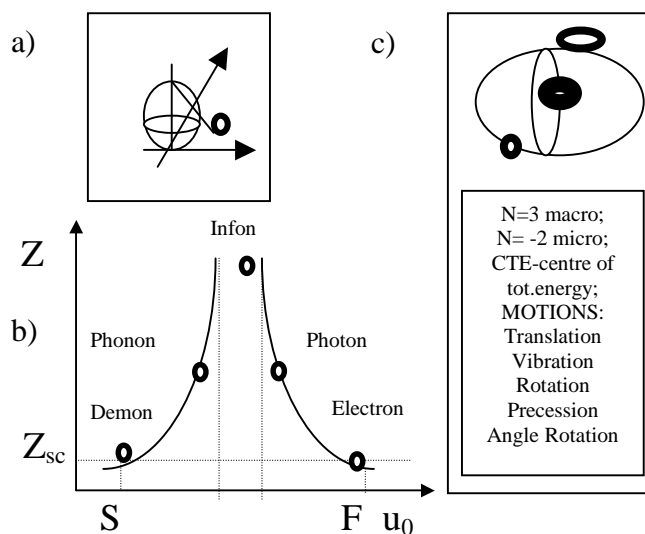*(D.P*.–Dispersed Phase-vertical; D.M*.–Dispersion Medium-horizontal)*

Figure 1. a) Mapping, b) hierarchy of entities, c) energetic ellipsoid.

References: A.M. Spasic et al. 6th World Congress of Chemical Engineering, Melbourne 2001
A.M. Spasic, *Electroviscoelasticity of Liquid-Liquid Interfaces* in A.V. Delgado (Ed.), *Interfacial Electrokinetics and Electrophoresis,* Marcel Dekker, New York 2001, Chapter 30.
Dj. Koruga, Fulerenes & Nanotubes Review, Vol I (1997) 75.