



## **Introduction to Continuum Mechanics**

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### Abstract:

Motion of elementary particles, electrons, atoms, molecules, clusters, lattices, grains, when we go into a continuum range, can be described by specific fields. Since the earliest days of continuum mechanics, it has always been recognized that the knowledge of this subject were to be obtained deductively from general laws. At the same time, these laws have not been expressed in any standard or usual mathematical formalism. Therefore, continuum mechanics, which appears as a part of the classical field theory, is a rational science based on deductions.

The propose of our lectures is to provide clarity and understanding for phenomenological elasticity, plasticity, rheology, viscosity, turbulence, nonequilibrium thermodynamics, thermo-chemistry, electro- and magneto-elasticity within the frame of continuum mechanics. The basis of continuum mechanics lie on phenomenological conservation laws of mass, momentum, moment of momentum, entropy, electricity (topological charges), etc. Independently from these laws a motion undergo of two fundamental restrictions, generally called first and second principles of thermodynamics. These two restrictions should be always taken into account during constructing of constitutive relations and appropriate kinematical relations.

The special aim of our lecture is to show how these two thermodynamic restrictions can be used for standing a new model of continua, like, for instance, a continua undergoing of phase transition. These two restrictions should be explained and learned, independently by every new generation of researches. Even if continuum mechanics has been studied for well over a century, there still are skeptics, revisions and critics. Therefore we should, every year, to clear and revalorizate the logical structure, to made modernization the mathematical tools and the language of presentation, to reconsider the fundamental principles in the light of contemporary experimental data.

<b>TREMINY WYKŁADÓW</b>			
22.11.2010	Poniedziałek	15-18	Audytorium IMP PAN
23.11.2010	Wtorek	15-18	Audytorium IMP PAN
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