

Symphony of Matter and Mind

Part one

Music of Matter Mechanism of Material Structures Formation

Chapter synopsis:

1. Sympathy of the Pendulums.

The chapter is about the development of the ideas on energy processes and interactions that lead to the creation of the structures of the world that we observe.

2. Polyphony of the Heavenly Spheres.

The chapter is dedicated to the history of ideas about cosmic phenomena.

3. Harmony Function.

The chapter introduces the reader to the modern concepts and explains some terminology that will be used throughout the study.

4. The Enigma of Gravity.

The chapter considers the riddle of the interaction of celestial bodies at a distance, talks about different models (classic and modern) trying to explain the observable phenomena, and looks at analogies between macrocosmic and microcosmic interactions.

5. Ensemble of Planets.

In this chapter, the analogies develop into the first hypothesis about the nature of the mechanism of interaction.

6. World Model Evolution.

This chapter shows how paradigms in theoretical physics changed, but the primary bias towards an atomistic picture of the world remained.

7. Certain Uncertainty of Physics.

The chapter is dedicated to the history of attempts to overcome the dead-ends and contradictions of the corpuscular model, discussions concerning this issue leading to the statistical interpretations of physical laws, which seemed to produce a solution by turning physical regularities into probabilistic uncertainty issues.

8. Returning Physical Meaning to the Wave Function.

The chapter tells how the wave function equation that was taken initially from the description of physical oscillatory phenomena turned into a description of a probability of virtual particles being in one or another state. It shows what was the fundamental misunderstanding in the debate about the uncertainty principle, how the physical meaning evaporated from the wave equation and what should be done to get it back. It also begins the

journey into the new model by formulating the hypothesis about the nature of fundamental structures of matter, the mechanism of their formation, change and interaction.

9. Musical Notes of Matter.

This chapter dwells upon the riddle of the chemical elements' periodicity represented phenomenologically by the Periodic Table. It shows contradictions in the explanation within the corpuscular 'planetary' model of an atom. With the help of the hypothesis within the proposed model, the chapter gives a new explanation of the periodic table and chemical elements' structure. It uncovers the secrets of the observables that have been described by the atomic alphabet.

The new model provides the idea about the physical mechanism hidden behind quantum numbers of the elements and their spin characteristics without relying on any 'magical' quantum properties that are not explained within the prevailing Standard Model of particle physics. Thus, it gets out of a scientific dead-end when holes in explanation are hidden by the fog of mathematical descriptions of virtual particles interactions. The chapter also gives the phase portrait of the fundamental oscillatory system that underlies complex structures of matter.

10. Octaves of Matter.

This chapter continues to solve the mysteries of fundamental structures. It takes Pauli's exclusion principle and three rules that stem from it, finds a physical explanation for these phenomenologically derived descriptions of interactions and principles of basic structures formation. It contains several hypotheses that develop previous ones and take us from the fundamental levels to the secrets of complex structures creation.

11. The Reality of Wave Interactions.

The chapter compares the hypotheses provided within the new model with the views that involve all kinds of mysterious quantum properties and quantum leaps that the mainstream model does not explain but tells us that this is the way nature is and we do not need to understand it.

12. Energy Relay Race.

This chapter looks at fundamental concepts of classical physics like attraction-repulsion, interaction, force and field. It offers a new way of looking at them, which helps to get out of a vicious circle of mystical or tautological explanations that boil down to 'just because.' It also starts to build bridges to the shores of life sciences. It asks a simple question: are electromagnetic, strong, weak, gravitational, thermodynamic, inorganic chemical, organic chemical and biological phenomena produced by different forces and fields, or are they bound by the same fundamental laws that are the manifestations of a universal physical mechanism? Should we continue to multiply entities creating 'spirits' responsible for various phenomena like our ancestors did in the era of animism or start talking physics?

13. Myths of Theoretical Physics of the Twentieth Century.

This chapter shows what the multiplication of entities in models of theoretical physics has led to.

14. Energy Medium.

This chapter touches upon the fundamental question behind all aspects of modeling energy interactions: what is the medium and its properties? Classical mechanics lived in a ‘paradise’ of ignoring interaction at a distance and studied the direct interaction of bodies. But this couldn’t continue when we got to the microcosmic level and understood that any interaction, even if at a certain level it seems to be direct, is an action at a distance.

Quantum mechanics and its heiress, the Standard Model, avoided the issue by postulating that all interactions on microscale are mediated by ‘virtual’ particles that ‘real’ particles exchange. General Theory of Relativity took responsibility for macroscale and postulated that there is no interaction really and all the observed phenomena that we call ‘gravitational’ result from the curvatures of an entity space-time fabric that is here, there and everywhere and curves as it wishes. So, in both leading theories the question was ‘solved’ in favor of the proclaimed virtual entities that mediate the interaction of real entities. The problem is that they speak of different entities and thus cannot be unified within one concept of interactions that theoretical physics has been trying to build (‘theory of everything’).

Can we avoid this dead-end? Yes, but only by looking in the other way. There is no sense in trying to unify two old models. Maybe we should look for a universal mechanism that has the same manifestations at all levels of interaction? If nature has a unifying mechanism, we can try and create an integrative model of all interactions. Then the question of a medium can be resolved by studying the mechanism and not looking for some omnipotent entities responsible for the way things are.

15. The Origins of the Corpuscular Paradigm Error.

This chapter goes back into the history of the question about the medium. It shows how the corpuscular model of the world led prominent scientists of the classical period to resort to divine intervention hypothesis when facing the riddle of interaction at a distance. Modern models do not mention God as a primary explanation but invent virtual ‘angels’ that carry interaction on their ‘wings.’ Either way is not acceptable within the scientific method.

16. Problems of the Classical and Quantum Models.

This chapter tells the story of how the discrete measurement (quantization) of continuous processes turned into particles (quanta) and how this objectification error led to the following endless search for the basic ‘brick’ of the Universe (‘particle of God’) and creation of virtual entities ad infinitum. It also proposes an alternative solution that goes back to the classical wave theory but takes it further, relying on the proposed interaction mechanism.

17. Wave Team vs. Particle Team Match Report.

This chapter takes us back a hundred years ago when the heated debate about the nature of light ended in a victory of the corpuscular model that represented light as massless particles (photons) that could fly in the void. It clearly shows why the classical wave theory of light, which had a broad empirical base, crumbled under the attack of a new quantum theory of light: it failed to propose the interaction mechanism. The Particle team that proposed a virtual mechanism won the game and is still keeping the victory cup in its cabinet.

18. The Physical Meaning of Mass.

This chapter deals with the issue of mass and its relation with energy from the point of view of a proposed model. It contains the hypothesis that explains how mass is formed, how energy, momentum and mass are transferred, takes a new look at the equivalence of mass and energy, proposes an insight into a process that creates mass as a certain form of energy. It addresses one of the central ontological questions: how is this material (massive) world arranged? After all, physics as a science is called upon to answer this question.

The standard models take the phenomenological approach and describe the observed without explaining it or invent an entity (field) that magically creates inert mass for the virtual particles as carriers of interaction (quanta of this field). These models create an illusion of explanation by introducing a new spirit with special powers to do the things we observe. They stay within the vicious circle of multiplying entities.

19. The Need for a New Theory.

Considering the contradictions and impasses of the mainstream theoretical models, the need for a new theory seems to be self-evident. But they have become dogmas that are considered impeccable. In the twentieth century, theoretical physics ceased to be a branch of science where hypotheses are theorems that require empirical proof and became a set of axiomatic constructions requiring only the art of mathematical description. We can even say that the prevailing trend in theoretical physics is this: if a model is described mathematically, it is considered proven. So, from an instrument for describing physical phenomena, mathematics has turned into a way to create arbitrary virtual entities and hide contradictions by such tricks as renormalization. Even the founding fathers of the Standard Model acknowledged that they play “shell game” and called it “hocus-pocus” and “dippy process” (Richard Feynman).

Should we return physical sense to models and get back to physical math? The question seems rhetorical, but it requires an answer in the form of an alternative model that will offer a plausible mechanism and provide adequate explanations to the accumulated empirical facts without resorting to any “hocus-pocus” routine that has become so standard in the Standard Model.

In this chapter, the author continues to develop hypotheses about the mechanism of energy interactions that leads to the formation of structures of Matter and their changes accompanied by binding and release of energy. He also offers a name for the model: Theory of Energy Harmony. The name is not metaphorical but speaks directly about the mechanism described.