Basic Structures of Different Size Scales

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Abstract: Here, applying the Scale-Symmetric Theory (SST), we listed the basic structures in the Universe at different scales. They are as follows: multi-loop-like structures, condensate-like structures, atom-like structures, and binary systems. We have highlighted the structures that should be discovered or accepted in the future. Black hole with a central singularity and 3-quark model of baryons do not fit into the generalized scheme presented here. There is place for the quarks as the loops.

1. Tables with listed basic structures at different scales

Table 1a. *Basic structures of different size scales*

Basic structures	Size scale			
	Cosmic	**Star/planet**	**Atomic**	**Particle-physics**
Multi-loop-like	**1.** Circular-like filaments composed of galaxies and dark matter	**1.** Thermal cells in the convection zone of the Sun **2.** Highs and lows in the Earth's atmosphere	**1.** Fullerene-like structure	**1.** Two sizes of electric charge – they are tori composed of entangled smaller tori [1]: **–** torus/charge-of-electron **–** torus/charge-of-proton Will be discovered **2.** Torus/weak-charge of neutrino – it is torus composed of entanglons which are the binary systems of closed strings [1]: Will be accepted

Table 1b. *Basic structures of different size scales*

Basic structures	Size scales			
	Cosmic	**Star/planet**	**Atomic**	**Particle-physics**
Atom-like	**1.** Quasar: BH + accretion disc + opaque torus **2.** Active galaxy: quasar + orbiting stars and dust **3.** Galaxy + orbiting satellite dwarf galaxies **4.** Core of massive galaxy + orbiting stars **5.** Protoworld: BH + torus + ring [2] – it was the initial cosmological state before the expansion of the Universe Will be accepted	**1.** Star + planets **2.** Planet + moons of the planet	**1.** Atoms: atomic nucleus + "orbiting" electrons	**1.** Baryons: central condensate + torus/charge + loops of pions or pions on baryonic shells (there can be pairs of quarks as the binary systems of loops [3]) [1] Will be discovered **2.** Neutrinos: central condensate + torus/weak-charge [1] Will be accepted **3.** Charged leptons: central condensate + torus/electric-charge [1] Will be discovered

Table 1c. *Basic structures of different size scales*

Basic structures	Size scale			
	Cosmic	**Star/planet**	**Atomic**	**Particle-physics**
Condensate-like	**1.** Cluster of galaxies **2.** Black hole (BH) composed of the neutron black holes [2] Will be discovered	**1.** Globular clusters	**1.** Liquids and solid bodies	**1.** Atomic nuclei **2.** Condensates of Einstein-spacetime components in centres of charged fermions [1] Will be discovered **3.** Condensates of pions and other mesons [1] Will be discovered

Table 1d. *Basic structures of different size scales*

Basic structures	Size scales			
	Cosmic	**Star/planet**	**Atomic**	**Particle-physics**
Binary system	**1.** Two-core galaxy **2.** Two galaxies with bar **3.** Binary systems of galaxies	**1.** Binary systems of stars	**1.** Binary systems of atoms as, for example, H_2, O_2	**1.** Deuteron **2.** Electron-positron pairs **3.** Neutrino-antineutrino pairs [1] Will be discovered **4.** Entanglons responsible for quantum entanglement [1] Will be accepted **5.** Neutral pion as binary system of loops [1] Will be discovered

2. Summary

There are four basic structures in the Universe at the four listed size scales (cosmic scale, star/planet scale, atomic scale, and particle-physics scale): multi-loop-like structures, condensate-like structures, atom-like structures, and binary systems.

Black hole with a central singularity and 3-quark model of baryons do not fit into the generalized scheme presented here. There is place for the quarks as the loops [3].

We have highlighted the structures that should be discovered or accepted in the future that existence follows from the Scale-Symmetric Theory (SST) based on the successive phase transitions of the non-gravitating, superluminal Higgs field [1].

References

[1] Sylwester Kornowski (6 June 2016). “Foundations of the Scale-Symmetric Physics (Main Article No 1: Patricle Physics)” http://vixra.org/abs/1511.0188

[2] Sylwester Kornowski (29 June 2016). “Foundations of the Scale-Symmetric Physics (Main Article No 2: Cosmology)” http://vixra.org/abs/1511.0223

[3] Sylwester Kornowski (3 December 2015). “Reformulated Quantum Chromodynamics” http://vixra.org/abs/1512.0020