Why and How Mainstream Cosmology Should Change

Sylwester Kornowski

Abstract: Both too much gold in the Universe and the recently observed metallicity of a globular cluster below an acceptable lower limit, are forcing a radical shift in mainstream cosmology.

Here we consider observational facts that contradict or have been in conflict with mainstream cosmology. We have shown that the emerging problems can be solved within the Scale-Symmetric-Theory (SST) cosmology [1], [2].

*To much gold in relation to the predictions of mainstream cosmology suggests that there were many more black holes [3] and that they already existed at the beginning of the expansion of the Universe [2], [4].

Thus, the expansion of the Universe had to be separated in time from the inflation, and a cosmic structure (we call it the Protoworld) had to be formed before the expansion of the Universe [1], [2].

*According to mainstream cosmology, in the oldest part of the Universe, we should observe the smooth primordial field (there should be hydrogen, helium-4 and very small amount of lithium and beryllium), then a “smooth field” of Population III (Pop III) stars, then a field of dwarf galaxies, and only then massive galaxies surrounded by dwarf/satellite galaxies. But we only see the last stage, that is, we see massive galaxies, quasars, massive galaxies surrounded by dwarf galaxies, and galaxy clusters. This suggests that we cannot observe a certain initial period of the Universe’s evolution, i.e. the Big Bang theory is wrong.

*Historically, astronomers have estimated the age of globular clusters (i.e. the spherical associations of stars that orbit a galactic core) to be longer than the mainstream age of the Universe [5], but additional assumptions, unfounded in my opinion, made the age paradox no longer valid.

The SST cosmology shows that the age of the Universe counted from the beginning of its expansion is ~21.6 Gyr and that we can observe the period of the last ~13.8 Gyr [2].

*To obtain the correct abundances of baryon matter, dark matter, photons and neutrinos, and dark energy for the very early and today Universe we must assume the similarity between the neutron and the virtual neutral pion inside it on one hand, and the Protoworld and the very early Universe inside it on the other hand [6]. Notice that the initial size of the Protoworld was ~1 Gly [2].

If we assume that the very early Universe was composed of the neutron black holes (NBHs) clustered in protogalaxies which in turn formed the large-scale structure of the very early Universe already before its expansion, we get many theoretical results consistent with the observational data [2].

According to the SST cosmology, the collision of dark matter with the neutron black holes and then the collisions between NBHs [4], [6] transformed some NBHs into the Population III stars. Initially such stars were composed of primordial gas, i.e. hydrogen, helium-4 and very small amount of lithium and beryllium. Mass of the Pop III stars was ~25 solar masses [2], i.e. no low mass Pop III stars were formed.

The Pop III stars produced the metals (astronomers call heavier elements metals) seen in the Population II (Pop II) stars that are most commonly seen in globular clusters.

We can see that the metallicity of the Pop II stars should be above a certain value defined by the evolution of the Pop III stars.

*But recently a globular cluster with metallicity below the acceptable lower limit has been discovered [7]. Can we explain this within the SST cosmology? It is obvious that the initial simultaneous collisions of many NBHs must have produced massive protuberances that ejected primordial gas out of the protogalaxies. From this metal-poor (almost metal-free) gas, a globular cluster containing stars with masses much lower than masses of the Pop III stars was formed. Thus, metal production in such Pop II stars has been significantly reduced in comparison with the Pop III stars. We can see that we have two different types of the Pop II stars – the initially almost metal-free stars created in the primordial gas we will call the Pop IIA stars, while the metal-poor stars created in the gas enriched with metals by the Pop III stars we will call the Pop IIB stars. This solves our problem. We can see that sometimes very old star clusters formed in the very early Universe can have metallicity below some minimum defined by mainstream cosmology.

We showed that age of the Pop IIA and Pop IIB stars are practically the same despite different metallicities.

It is not true that the almost metal-free globular clusters were ripped out of dwarf galaxies by massive galaxies because dwarf galaxies are no older than massive galaxies.

References

[1] Sylwester Kornowski (25 September 2020). “Foundations of the Scale-Symmetric Physics (Main Article No 1: Particle Physics)”
http://vixra.org/abs/1511.0188

[2] Sylwester Kornowski (14 February 2019). “Foundations of the Scale-Symmetric Physics (Main Article No 2: Cosmology)”
http://vixra.org/abs/1511.0223

[3] Chiaki Kobayashi, *et al.* (15 September 2020). “The Origin of Elements from Carbon to Uranium”
The Astrophysical Journal, Volume 900, Number 2
arXiv:2008.04660 [astro-ph] (11 August 2020)

[4] Sylwester Kornowski (10 October 2020). “Transformation of Neutron Black Holes into Expanding Hot Plasma”
http://vixra.org/abs/2010.0065

[5] Sylwester Kornowski (13 January 2016). “The Correct Age of the Universe”
http://vixra.org/abs/1412.0184

[6] Sylwester Kornowski (15 October 2020). “The Protoworld as a Neutron-Like Object”
http://vixra.org/abs/2010.0102

[7] Soren S. Larsen, *et al.* (15 October 2020). “An extremely metal-deficient globular cluster in the Andromeda Galaxy”
Science, DOI: 10.1126/science.abb1970
arXiv:2010.07395v1 [astro-ph.GA] 14 October 2020