

PFO–CFO Hypothesis of Solar System formation: its actuality and physical and chemical grounds

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Abstract

A new approach to understanding of the Universe nature and to the Solar System Formation mechanism: space is the small-concentration mass/energy, and stars are knots in it; stellar systems include physically formed objects (PFO) and chemically formed objects (CFO), all chemical elements of which originated from radioactive and non-radioactive pico-drops emitted by the central star; stellar energy results from radioactive-drops decays. All principal Solar System features are explained, and the Sun future is predicted.

Introduction: a little about actuality

The today astrophysics is grounded on the following assumptions: (1) fusion reactions are the source of the stellar energy; (2) the stellar states can be considered on the basis of ideal gas laws; (3) the light speed is constant over the Universe; (4) the light direction from any celestial source is constant over the Universe; (5) the gravitation coefficient (GC) is constant over the Universe.

If even any one of these assumptions is mistaken, the astrophysics of the beyond-Solar-System space should crumble to dust, because all distances, masses, and speeds of celestial objects and all fantastic dark matters and energies, holes, dwarfs, Bangs, etc. lie on this fundament.

Meanwhile, any assumption has no confirmation, and their uncertainty increases day by day. Assumption (1) was taken with no grounds as a result of euphoria that was born by the discovery of fusion reactions and by an opinion that it is unique solution of the problem. However, the stabilization of fusion reactions for long periods of stellar lives is rather questionable and the explanations of different processes and phenomena that follow from this assumption are not conclusive. As for assumption (2), likening of any highly-concentrated plasma to the ideal gas is questionable. As for assumptions (3) and

(4), data against them are available and they are completely unacceptable. Assumption (5) has no proofs and is questionable. The Universal light speed can be dependent on the distance and time by the following reasons: (i) Nothing testifies that the GC is constant in different stellar systems or, all the more, in different galaxies. It is known that light deviates under gravitation; thus, the light speed depends on gravitation. If the GC is different over the Universe and changes in an unknown manner, the light speed out of the Solar System (SS) is unpredictable. (ii) Even if the GC is the same over the Universe, it is possible that light propagates through the inter-galaxy space, in preference, along the between-galaxy channels and propagates through the intra-galaxy space, in preference, along the between-star channels, where gravitation to the adjacent objects is compensated; thus, it can propagate in a straight line along great but limited distances and, when propagating through multi-galaxy distances, chooses the directions of minimum resistance; in this case, its direction is also unpredictable. (iii) After development of the quantum field theory (1934), an opinion existed that gravitation is a property of each atom as such and that this property is caused by the existence of gravitons, i.e., massless spin-2 boson particles that represent carriers of this property. Meanwhile, no gravitons are discovered. Today, it is necessary to be rather obstinate optimists to wait the discovery of such particles and there are no grounds to believe that the GC is the Universal constant. It must not be ruled out (although we do not state) that gravitation is an integral feature of the space/celestial-body systems but not the feature of each atom and that this feature depends on the size and, may be, age of the stars that form stellar systems.

PFO-CFO hypothesis development

The 20th century gave the understanding of the possibility of the matter transition into energy and the numerical (at least, approximate) expression for the relation between these natural categories. Meanwhile, apparently, no unbalanced unidirectional transitions

should occur in nature, and, therefore, we think that it is natural to expect that the conditions, at which reverse transition of matter into energy, exist as well. We believe that the processes of these two types proceed in the space that is, thus, a participant of these processes, because both these processes can't proceed without participation of the space. The question on the nature of the space, as such, abstracted from these processes, is topical. Therewith, the answer to this question shouldn't contradict to the conservation law, according to which, when matter transforms into energy or, contrary, energy transforms into matter in a closed system, both mass and energy of the system remain constant. Thus, the notion of the space should contradict neither the possibility of mutual transitions of energy and matter nor the conservation laws, since both these statements follow from experiments. The way out of this situation, which looks like a paradoxical one, is, in our opinion, as follows.

We separate the notions of the mass and matter and consider the space as a low-potential energy/mass substance describable in terms of mass or energy and the stars as the knots of enhanced energy/mass concentrations in this space. With time, each star is compressing under gravitation, ionization, and neutronization and is dividing by the mechanisms given in [1-3] into a core and a radiation zone (RZ) separated with an electron-enriched layer (e-layer). Electrons float continuously from the core as a result of ionization of the core mass/energy substance; this leads to core protonization. The e-pressure increasing in the e-layer leads to destruction of its boundaries

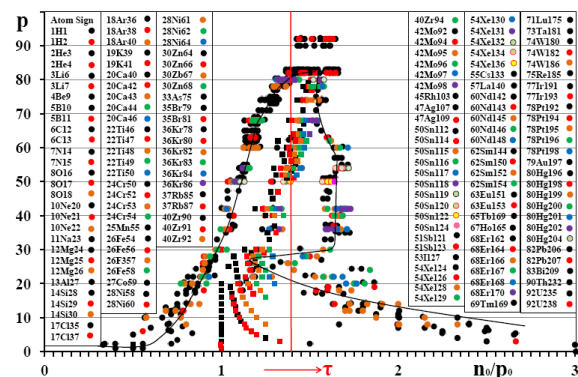


Figure: The proton numbers (p) in the produced stable atoms listed in the figure field vs. the (n_0/p_0) in parental radioactive (circles) and nonradioactive (squares) pico-drops emitted by the Sun for its full history; red line is the today Sun state; red arrow shows the time direction; right branch responds to the RG explosion and later.

into neutrons and protons and to continuous neutronization, which together with gravitation lead to RZ densification. Periodical increases in the e-pressure over the RZ back pressure lead to formation of protuberances. They consist of radioactive and nonradioactive pico-drops of the e-layer substance. The decays of the first ones are the source of the stellar energy. According to the theory, the stellar spectra (Fraunhofer's spectrum for the Sun) respond to the current composition of the elements produced by the star. Eventually, all these processes lead to the RZ explosion. The powerful pre-explosion protuberances and RZ explosion emit nonradioactive and radioactive pico-drops, which transform into the atoms of different elements, whose proton numbers depend on the degree of neutronization of the e-layer boundaries. The major portion of this material falls back to the star, and its minor portion forms the stellar system. The star transforms into its initial state of the mass/energy knot and begins its new life. Thus, the Sun is equivalent to the presolar star. The PFO and CFO formation mechanisms are detailed in [1-3].

The PFO-CFO hypothesis allows for plotting the Figure, which expresses the dependence of the proton number (p) in the isotopes formed from the solar substance on the degree of neutronization of e-layer environs (n_0/p_0) (the last increases with the Sun age). The right descending branch responds to the RZ explosive destruction. The red vertical line characterizes the today Sun state; the red arrow shows the time direction. The today Fraunhofer's spectrum contains elements up to Pb. Only one element (Bi) separate the today Sun state from the emission of Th and U long-lived radioactive isotopes. If our theory is correct, this figure is extremely important for population. According to it, the Sun had already passed the major portion of its way from the initial state to the RZ explosion.

References

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