
Evolution and ecology of the Universe

© G.I. Lovetsky, I.I. Komissarov

Bauman Moscow State Technical University, Moscow, 105005, Russia

Rapid upsurge in science development follows accumulating of knowledge, thus making the process evolutionary. Theories essentially comprise models based on rational principles as well as those that embrace social and cultural traditions. Advanced cosmological model builds on the unity of evolutionary and ecological approaches.

Key words: scientific models, cosmological model, the unity of evolutionary and ecological approaches.

REFERENCES

- [1] Popper K.R. *Obyektivnoye znaniye. Evolyutsionny podkhod* [Objective knowledge. An evolutionary approach]. Moscow, URSS, 2002.
 - [2] Storozhuk A.Yu. *Predely nauki*. The Limits of science]. Novosibirsk, 2005.
 - [3] Foley R. *Another unique species. Patterns in human evolutionary ecology*. Longman Group UK Limited 1987. [Russ. ed.: Foley R. *Yeshche odin nepovtorimy vid. Ekologicheskkiye aspekty evolyutsii cheloveka*. Moscow, Mir, 1990, 368 p.].
 - [4] Hawking S.W. *Black Holes and Baby Universes and other Essays*. Bantam Books. ISBN 978-0-553-37411-7. [Russ. ed.: Hawking S.W. *Chernye dyry i molodye vseelnyye*. St. Petersburg, Amphora Publ., 2001].
 - [5] Hawking S.W., Mlodinow L. *Vysshyy zamysel* [Devine Plan]. St. Petersburg, Amphora Publ., 2012 [in Russian].
 - [6] Hartmann S. Modelle und Forschungsdynamik: Strategien der zeitgenössischen Physik. *Praxis der Naturwissenschaften — Physik*, 1995, no. 1, ss. 33–41.
 - [7] Bailer-Jones D. *Scientific Models in Philosophy of Science*. Pittsburgh, University of Pittsburgh Press, 2009.
 - [8] Khain V.E., Ryabukhin A.G., Naimark A.A. *Istoriya i metodologiya geologicheskikh nauk* [History and methodology of geological sciences]. Moscow, Academy Publ., 2008.
 - [9] Efremov, Y.N. *Vglub Vselennoy: zvezdy, galaktiki i mirozdaniye* [Deep into the Universe: stars, galaxies and the universe. Moscow, Librokom Publ., 2013.
 - [10] Hawking S. *Tri knigi o prostranstve i vremeni* [Three books about space and time]. St. Petersburg, Amphora Publ., 2012 [in Russian].
 - [11] Penrose R. *Tsikly vremeni. Novyy vzglyad na evolyutsiyu Vselennoy* [Cycles of time. A new look at the evolution of the Universe]. Moscow, Binom, Knowledge Laboratory Publ., 2014.
 - [12] Gorokhov V.G. *Tekhnicheskkiye nauki: istoriya i teoriya (istoriya nauki s filosofskoy tochki zreniya)* [Technical science: history and theory (history of science from a philosophical point of view)]. Moscow, Logos Publ., 2012.
 - [13] Stepin V.S. *Filosofiya nauki. Obshchiye problemy* [Philosophy of science. General problems]. Moscow, Gardariki Publ., 2006.
 - [14] Fedorov N.F. *Sobraniye sochineny. V 4 tomakh. Tom 1* [Collected works. In 4 volumes, volume 1]. Moscow, Progress Publ., 1995.
 - [15] Vladimírsky B.M., Kislovsky L.D. *Putyami russkogo kosmizma* [Ways of Russian cosmism]. Moscow, Librokom Publ., 2011.
-

-
- [16] Umov N.A. *Fiziko-mekhanicheskaya model zhivoy materii. Russkaya mysl. God dvadtsat treti, kniga II*. [Physico-mechanical model of living matter. Russian thought. The twenty-third year, book II]. Moscow, 1902, pp. 1–15.
- [17] Sechenov I.M. *Dve zaklyuchitelnye lektsii o znachenii tak nazyvayemykh rastitelnykh aktov v zhivotnoy zhizni. Izbrannye proizvedeniya. V 2 tomakh. Tom 1*. [Two final lectures about the importance of so-called plant acts of animal life. Selected works. In 2 vols. Vol. 1]. Moscow, 1952.
- [18] Ogurtsov A.P. K.E. Tsiolkovsky and V.I. Vernadsky (sравnitelny analiz filosofskikh idey). *Trudy 10-kh chteny K.E. Tsiolkovskogo. Sektsiya "Issledovaniye nauchnogo tvorchestva K.E. Tsiolkovskogo"*. [K.E. Tsiolkovsky and V.I. Vernadsky (comparative analysis of philosophical ideas). Proceedings of the 10th K. E. Tsiolkovsky readings. Section "Study of K. E. Tsiolkovsky's scientific work"]. Kaluga, 1977, pp. 3–19.
- [19] Mamchur E.A. *Polignozis — Prognosis*, 2011, no. 2 (41), pp. 3–18.
- [20] Tsiolkovsky K.E. Zhivye sushchestva v kosmose. [Living beings in space]. In: *Grezy o Zemle i nebe* [Dreams of Earth and sky]. Tula, 1986.
- [21] Vernadsky V.I. *Nauchnaya mysl kak planetarnoye yavleniye* [Scientific thought as a planetary phenomenon]. Moscow, Nauka Publ., 1991.
- [22] Mironov V.V., ed. *Sovremennyye filosofskiyе problemy estestvennykh, tekhnicheskikh i sotsialno-gumanitarnykh nauk* [Modern philosophical problems of natural, technical and social sciences and humanities]. Moscow, Gardariki Publ., 2006.
- [23] Vernadsky V.I. *Razmyshleniya naturalista: nauchnaya zhizn kak planetarnoye yavleniye. Kniga 2* [Reflections of a naturalist: the scientific life as a planetary phenomenon. Book 2]. Moscow, 1977.
- [24] Teilhard de Chardin. *Bozhestvennaya sreda*. [Divine environment]. Moscow, Gnosis Publ., 1994 [in Russian].
- [25] Kung, G. *Nachalo vsekh veshchey: estestvoznaniye i religiya*. [The Beginning of all things: science and religion], Moscow, Bible-theological Institute, 2007[in Russian].
- [26] Florensky P.A. *Pifagorovy chisla. Sochineniya v 4 tomakh. Tom 2* [Pythagorean numbers. Works in 4 vols. Vol. 2]. Moscow, Mysl' Publ., 1996.
- [27] Kazyutinski V.V. *A.L. Chizhevsky kak myslitel. Nauka i filosofiya nauki. V 3 chastyakh* [A. L. Chizhevsky as a thinker. The science and philosophy of science: 3 parts]. Lovetsky G.I., comp. Moscow, Bauman MSTU Publ., 2014.
- [28] Lovetsky G.I., comp. *Nauka i filosofiya nauki. V 3 chastyah. Chast 3. A.L. Chizhevsky: zhizn pod znakom Solntsa i elektrona. Vybrannye mesta iz nauchnogo naslediya uchenogo*. [Science and philosophy of science. In 3 parts. Part 3. A. L. Chizhevsky: life under the sign of the Sun and of the electron. Selected places from the scientific heritage of the scientist]. Moscow, Bauman MSTU Publ., 2014
- [29] Gagaev A.A., Skipetrov V.P. *Filosofiya A.L. Chizhevskogo* [Philosophy of A.L. Chizhevsky]. Saransk, Mordovian University Publ., 1999.
- [30] Lovetsky G.I., comp. *Nauka i filosofiya nauki. V 3 chastyah. Chast 2. Filosofiya nauki i russky kosmizm*. [Science and philosophy of science. In 3 parts. Part 2. Philosophy of science and Russian cosmism]. Moscow, Bauman MSTU Publ., 2014.
- [31] Kaznacheev V.P., Trofimov A.V. *Ocherki o prirode zhivogo veshchestva i intellekta na planete Zemlya: problemy kosmoplanetarnoy antropoekologii*. [Essays on the nature of living matter and intelligence on the planet Earth: problems of cosmoplanetary anthropology]. Novosibirsk, Nauka Publ., 2004.
- [32] Yashin A.A. *Ontogenez zhizni i evolyutsionnaya biologiya* [Ontogenesis of life and evolutionary biology]. Moscow, 2007.
-

[33] Bazaluk O. A. *Mirozdaniye: zhivaya i razumnaya materiya (istoriko-filosofsky i estestvennonauchny analiz v svete novoy kosmologicheskoy kontseptsii)*. [The universe: live and reasonable matter (historical-philosophical and scientific analysis in the light of the new cosmological concept)]. Dnepropetrovsk, Porogy Publ., 2005.

Lovetsky G.I., Dr. Sci. (Philosophy), professor, head of the Philosophy and Political Sciences Department at Kaluga Branch of Bauman Moscow State Technical University. Academic interests include social philosophy, philosophy of science and technology. e-mail: ce3@bmstu-kaluga.ru

Komissarov I.I., postgraduate at Bauman Moscow State Technical University. Academic interests include scientific models. e-mail: opium1050@mail.ru

The specialty sections of *Frontiers in Ecology and Evolution* will publish, under a single platform, contemporary, rigorous research, reviews, opinions, and commentaries that cover the spectrum of ecological and evolutionary inquiry, both fundamental and applied. Articles are peer-reviewed according to the *Frontiers* review guidelines, which evaluate manuscripts on objective editorial criteria. Through this unique, *Frontiers* platform for open-access publishing and research networking, *Frontiers in Ecology and Evolution* aims to provide colleagues and the broader community with ecological and evol... Evolution of the Universe Part of Hall of the Universe. Become a Member » Buy Tickets ». Evolution of the Universe main content. Evolution of the Universe. Part of Hall of the Universe. AMNH/D. Finnin. Dorothy and Lewis B. Cullman Hall of the Universe. Share. Collect. » Galaxies form and evolve within an expanding and cooling universe. Because light takes billions of years to cross the cosmos, we see distant galaxies as they were at earlier times. Astronomers not only theorize about cosmic evolution - they can actually observe its various stages. Early Universe. The hot and dense early universe was a cauldron of phenomenal energy. As the universe cooled, matter condensed out of energy. Within the first second, subatomic particles formed.