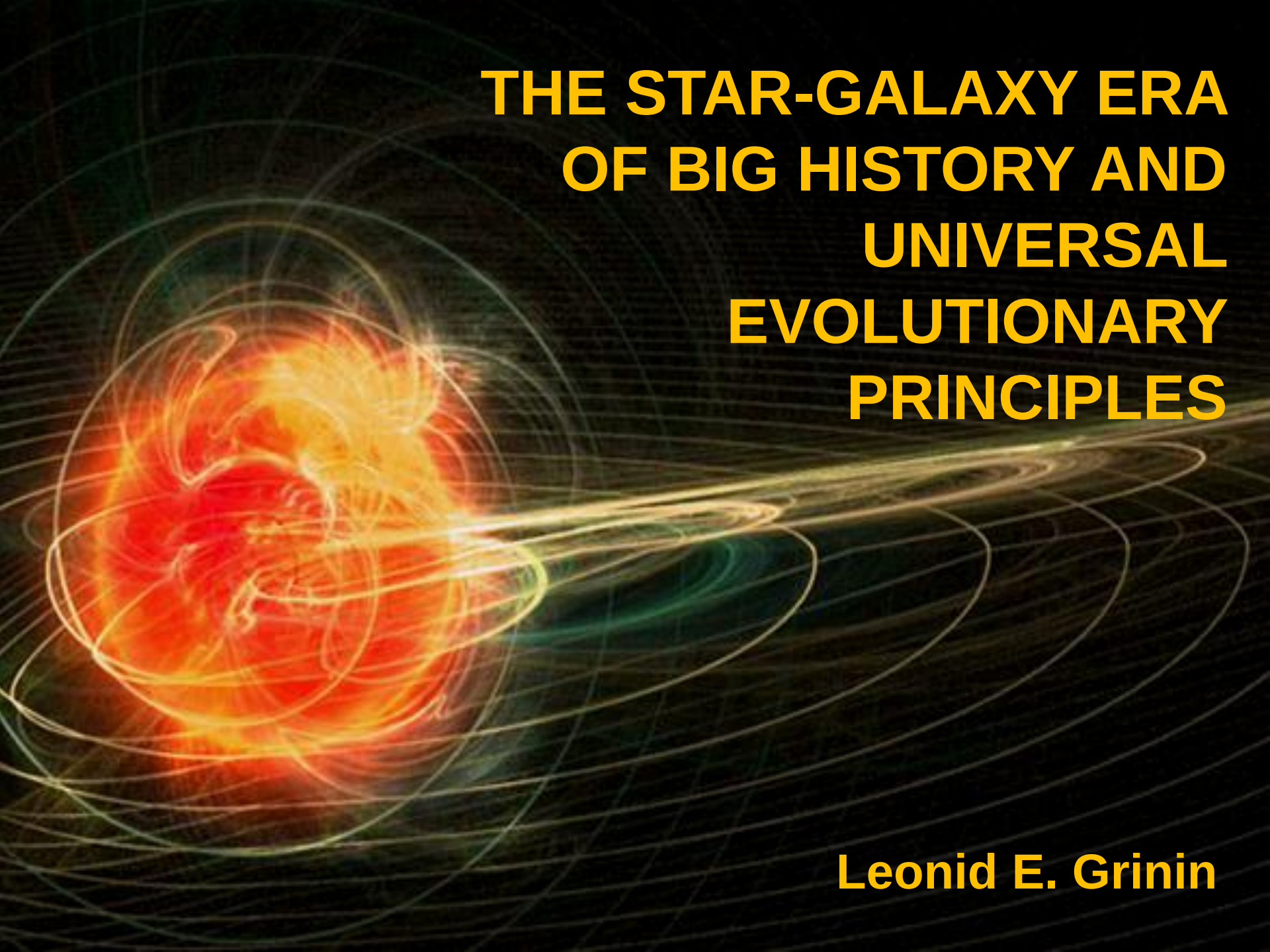

THE STAR-GALAXY ERA OF BIG HISTORY AND UNIVERSAL EVOLUTIONARY PRINCIPLES

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- The present paper attempts to study similarities at various levels and phases of Big History basing on the star-galaxy era transformations.
- Those principles and observations are grouped below into three blocks.

Block 1. Evolution Proceeds with Constant Creation and Destruction of Objects

- ‘Evolution is stronger than individual objects’.
- Creative destruction.
- In every end there is a beginning.

‘Evolution is stronger than individual objects’

- Life goes on exactly because organisms are mortal.
- Cosmic processes are also accompanied by constant emergence and death of various objects. So we may say: ‘The cosmos is stronger than stars and galaxies’.
- In general: ‘Evolution is stronger than individual objects’.

Creative destruction

- The nature, when creating, destructing, and renewing various objects, ‘tests’ many versions, some of which turn out to be more effective and have more chances to succeed in terms of evolution. For such a situation of selection within constant destruction and creation processes, it appears possible to use a rather appropriate notion of *creative destruction* suggested by Joseph Schumpeter.

In every end there is a beginning

- The of remains dead objects becomes building material for the formation of new objects. This proves circulation of matter and energy in nature. It also allows using the results of long-lasting processes (in particular, the accumulation of heavy elements, genetic or social changes).

Block 2. Individuality and Self-preservation

- Individuality as a way to increase the evolutionary diversity.
- Continuity.
- Self-preservation.
- Origins of the struggle for resources.

Individuality as a way to increase the evolutionary diversity

- With the formation of stars one could observe the emergence of individual objects in nature. That ‘individuals’, being quite similar, have rather different individual fates depending much on circumstances of their birth and various contingencies.
- For example, it can take the low-mass stars many billions of years to use up their fuel, whereas blue giants burn out hundreds of times faster. The stars depending on their masses can end their lives in rather different ways.

Continuity

- The stars can be presented as a continuous series from heavier to the lightest ones which become hardly distinguished from big planets.
- There is also a continuum of phases in the transformation of cosmic clouds into stars.
- The continuum of forms and sizes of objects may be observed at geological, biological, and social phases of evolution.

Self-preservation

- Stars, galaxies, and planets have their definite, quite structured and preserved form. The evolutionary paradox – *the struggle for the self-preservation is the most important source for development* – can be observed here in its full-fledged form.

Origins of the struggle for resources

- The struggle for resources among stars and galaxies may proceed through a direct transfer of energy and matter from one body to another, in form of ‘incorporation’, ‘capturing’, that is ‘annexation’ of stars and star clusters by larger groups.
- Some astronomers maintain that throughout a few billions of years our galaxy has ‘conquered, robbed, and submitted’ hundreds of small galaxies.

Block 3. Multilinearity

- Main and lateral lines of evolution.
- Classical forms and their analogues.
- Two parallel forms of existence of cosmic matter.

Main and lateral lines of evolution

- At every stage of the evolutionary development one can find the *interaction of a few lines*, in particular a combination of the main evolutionary line and a number of lateral ones.
- They allow increasing the diversity, broadening the range of search opportunities to move to new levels of development and enriching the main evolutionary stream.
- We quite often deal with two or more coexisting and comparable lines of development whose convergence may lead to a qualitative break-through.

Classical forms and their analogues

The main and lateral lines of evolution may be considered in two dimensions: horizontal and vertical. Thus:

- It is possible to speak about classical versions and their analogues.
- Various forms of aggregation and specialization of unicellulars can be regarded as analogues of multicells.
- Various complex stateless polities can be regarded as state analogues.

Stars and molecular clouds as two parallel forms of existence of cosmic matter

- In this respect we may consider stars and galaxies as the main line of evolution, while giant clouds – as its lateral lines. The former may be denoted as ‘classical forms’, and the latter may be designated as ‘analogues’.
- In fact, those forms transform into each other. Galaxies and stars emerge from giant molecular clouds, whereas stars through explosions and shedding their envelopes may transform into gas-dust clouds.

This diverse and single world

- Our world is immensely diverse and unlimited in its manifestations.
- However, fundamentally it is a single world.
- Studying those fundamentals reveals some new points for our understanding of evolution and Big History, their driving forces, vectors, and trends; it creates a consolidated field for interdisciplinary research.

Thank you for attention!