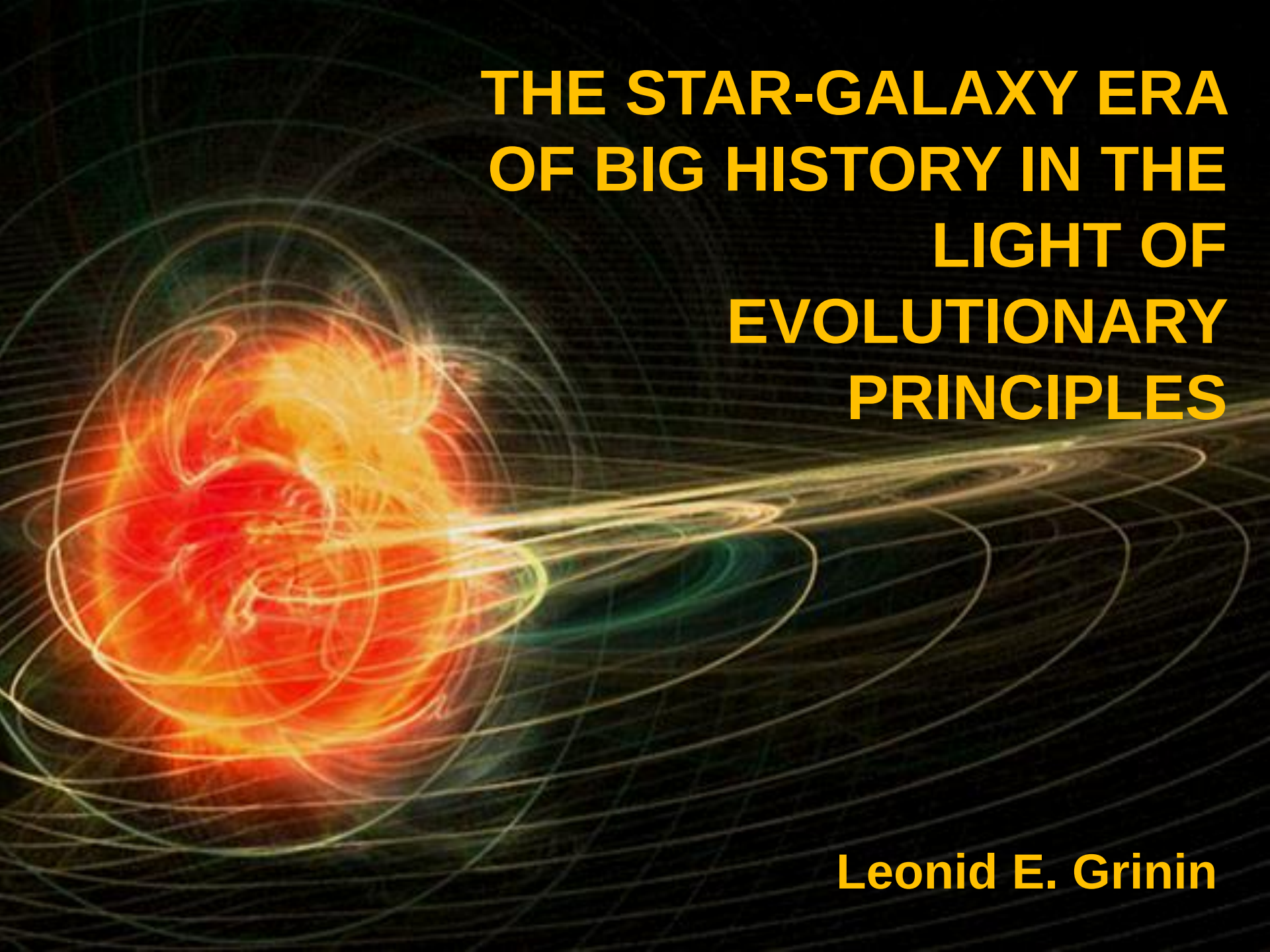

THE STAR-GALAXY ERA OF BIG HISTORY IN THE LIGHT OF EVOLUTIONARY PRINCIPLES

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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.

These blocks are defined as follows:

1. Evolution proceeds with constant creation and destruction of objects;

2. Individuality, self-preservation and the struggle for resources;

3. Multilinearity.

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 and destructing various objects, ‘tests’ many versions, some of which turn out to be more effective. 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 material of dead objects becomes building blocks for the formation of new objects.
- This allows using the results of long-lasting processes (e.g., the accumulation of heavy elements, genetic or social changes).
- This process ensures a field for advancement to new forms.

Block 2. Individuality, Self-preservation and the Struggle for Resources

- 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

- One could consider stars as the first individual objects in nature.
- Those ‘individuals’, being quite similar, have rather different individual fates much depending on circumstances of their birth and various contingencies.
- For example, depending on their masses, stars 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 levels of evolution.

Self-preservation

- Stars, galaxies, and planets have the quite structured and preserved forms.
- The struggle for self-preservation creates a wide range of interaction between a system and its environment.
- The struggle for self-preservation is the most important source for development.

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 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

The main and lateral lines of evolution

- At every stage of the evolutionary development one can find the *interaction of a few lines,* in particular the main evolutionary line and a number of lateral ones.
- They allow increasing the diversity, and broadening the range of search opportunities to move to new levels of development.
- Convergence of coexisting lines of development may lead to a qualitative break-through.

Classical forms and their analogues

The main and lateral lines of evolution may be considered as classical versions and their analogues.

- Various forms of aggregation and specialization of unicellulars can be regarded as analogues of multicellulars.
- 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 may transform into gas-dust clouds through explosions and shedding their envelopes.

Conclusion

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; it creates a consolidated field for interdisciplinary research.

Thank you for your attention!