Model of Local Expansion and Gravity as Interaction of Potentials

L. A. Serebrennikov
Independent Researcher
Email: rubikkon@gmail.com

February 12, 2026

Abstract

This work presents a model of the Universe's expansion and gravity through an analogy with rubber balloons. Key terms are defined, such as mass as expansion potential, volume as the degree of matter stretching, and gravity as the interaction of potentials against the background of expansion. The model describes expansion as a search for equilibrium, where gravity arises from competition for space. A mathematical formulation is proposed with the Hubble parameter as a function of density and potential.

Keywords: Universe expansion, gravity, Hubble parameter, energy potential, matter density, balloon analogy, search for equilibrium.
viXra Category: Artificial Intelligence / Physics (Cosmology).
MSC codes: 83C05 (General relativity), 85A40 (Cosmology).

Preface

This text is a direct record of the model, presented through an analogy with rubber balloons. All definitions are given as they were formulated.

1 WHAT IS WHAT (Dictionary of Terms)

Term	Definition
Deflated rubber balloon	Area of space with maximum energy density. Not expanded. Has no visible internal volume — compressed to the limit. Its rubber is the energy of bonds, ready for stretching.
Balloon mass	Not the amount of substance. This is the potential energy for expansion in volume. Stored ability to create maximum volume.
Balloon volume	Characteristic not of space, but of matter itself. Degree of its stretching, density. Fully deflated balloon = minimum volume, maximum density. Fully inflated balloon = maximum volume, minimum density.
Inflating the balloon	Hubble parameter. Expansion of the Universe.
Two balloons nearby	Two areas of space with different masses (potentials) and different volumes, expanding near each other.
Interaction during inflation	Gravity. Interaction of rest masses against the background of the Universe's expansion.
Expansion of the Universe	Search for equilibrium state.

2 LOGIC OF THE PROCESS (How it works)

2.1 Initial state

Each deflated balloon has:

- mass M — expansion potential;
- minimum volume $V_{\min}$;
- maximum density $\rho_{\max} = M/V_{\min}$.

The greater the mass, the larger the maximum volume that can be achieved:

$$V_{\max} \sim M$$

2.2 Expansion (inflation)

All balloons start inflating simultaneously. The inflation rate of each balloon depends on its current density, potential, and current volume.

Hubble parameter $H = \dot{V}/V$ is a function:

$$H = f(\rho, M, V)$$

2.3 Interaction (gravity)

When two balloons inflate nearby, they cannot expand independently. They are in a common rubber medium. Their expansion competes for space.

Rule:

- Balloon with greater mass has more "right" to volume;

- Balloon with lesser mass is forced to expand slower in the direction of the larger one;
- This is perceived as attraction of the smaller to the larger.

Gravity is the redistribution of expansion in favor of the greater potential.

2.4 Expansion as search for equilibrium

The Universe strives for a state where:

- All balloons are inflated to their maximum volume;
- Densities are equalized to minimum;
- Density gradients are absent;
- Expansion is stopped ($H = 0$);
- Gravity is absent;
- Mass equals zero.

This state is the absolute zero of expansion. It is never achieved, because as long as there are gradients — there is expansion, and as long as there is expansion — there are inhomogeneities.