ORIGINAL AXIOMATIC LAGRANGIAN OF THE AU-FIELD

Dmitry Yashchenko, Svobodny, Amur Region,
Russian Federation
yashchenko.dmitry@gmail.com
me@liberurban.ru
X: @graviton2011
@dmitryactauniversi.bsky.social

21.04.2026

Acta Universi hypothesis: field formulation

Below is **the original Lagrangian** postulated for the AU field $\mathcal{A}_\mu$(gauge correlation field) and its interaction with matter, consciousness, and the geometry of space-time. The Lagrangian is based on the following axioms:

1. **The AU field** is a fundamental gauge field associated with the information-correlation structure of the universe.
2. **Space-time** is emergent, but at low energies it is described by the metric g_{mv}. The AU field interacts with the metric through the correlation tensor C_{mv}.
3. **Consciousness / thought forms** are described by the scalar fieldΦ(entropy field), which draws and writes information in the AU field.
4. **The principle of least action** and gauge invariance with respect to local transformations $\mathcal{A}_\mu \to \mathcal{A}_\mu + \partial_\mu \theta$.

---

1. FULL LAGRANGIAN OF THE AU-FIELD

$$\boxed{\mathcal{L}_{\text{AU}} = \mathcal{L}_{\text{kin}} + \mathcal{L}_{\text{Chern-Simons}} + \mathcal{L}_{\text{bond}} + \mathcal{L}_{\text{entropy}} + \mathcal{L}_{\text{matter}} + \mathcal{L}_{\text{cosm}}}$$

1.1. Kinetic term (generalized gauge term)

$$\mathcal{L}_{\text{kin}} = -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} - \frac{\xi}{2} (\partial_\mu \mathcal{A}^\mu)^2 + \frac{\alpha}{2} \epsilon^{\mu\nu\rho\sigma} C_{\mu\nu} C_{\rho\sigma}$$

- $F_{\mu\nu} = \partial_\mu \mathcal{A}_\nu - \partial_\nu \mathcal{A}_\mu$is the AU field strength tensor.
- The second term is a gauge — fixing term (of the typeR_ξ).
- The third term is topological (analogous to the Pontryagin term), where $C_{mv}$is the correlation tensor constructed from $\mathcal{A}_\mu$and the metric:
  $C_{mv} = \nabla_\mu \mathcal{A}_\nu v + \nabla_\nu \mathcal{A}_\mu + \kappa \mathcal{A}_\mu \mathcal{A}_\nu$v.

1.2. Chern-Simons (topological term for nonlocality)

$\mathcal{L}_{\text{CS}}$
$= \frac{\theta}{4\pi} \epsilon^{\mu\nu\rho\sigma} \mathcal{A}_\mu \, \partial_\nu \mathcal{A}_\rho \, \partial_\sigma \mathcal{A}_\tau$(in the 3+1)-dimensional version — the Chern-Simons term for the 3-form?

More correctly, for an AU field as a 1-form:

$$\mathcal{L}_{\text{CS}} = \frac{k}{4\pi} \epsilon^{\mu\nu\rho\sigma} \mathcal{A}_\mu F_{\nu\rho} \mathcal{A}_\sigma$$

(effective term that generates mass and nonlocality).

1.3. Interaction term with the correlation tensor

$$\mathcal{L}_{\text{bond}} = \beta_1 R_{\mu\nu} C^{\mu\nu} + \beta_2 C_{\mu\nu} T^{\mu\nu}_{\text{мат}} + \beta_3 C_{\mu\nu} \, \partial^\mu \Phi \, \partial^\nu \Phi$$

- R_{mv} is the Ricci tensor (gravity),
- $T^{-}_{=\text{mv}}$energy-momentum tensor of matter,
- Φ is the entropy / consciousness field.

1.4. The entropic field of thought forms

$$\mathcal{L}_{\text{entropy}} = \frac{1}{2} \partial_\mu \Phi \, \partial^\mu \Phi - V(\Phi) + \lambda \Phi \, \epsilon^{\mu\nu\rho\sigma} \, \partial_\mu \mathcal{A}_\nu \, \partial_\rho \mathcal{A}_\sigma$$

Potential:

$$V(\Phi) = \frac{m_\Phi^2}{2} \Phi^2 + \frac{g}{4} \Phi^4 - \mu \Phi S_\Theta$$

where S_Θ is the entropy of thought forms (a macroscopic variable).

1.5. Term of interaction with ordinary matter (fermions, scalars)

$$\mathcal{L}_{\text{matter}} = \bar{\psi}(i\gamma^\mu D_\mu - m_\psi)\psi + \frac{1}{2}(\partial_\mu \phi)^2 - \frac{1}{2} m_\phi^2 \phi^2 + \sum_i \left(g_i \mathcal{A}_\mu J_i^\mu \right)$$

- The covariant derivative$D_\mu = \partial_\mu + i e_{AU} \mathcal{A}_\mu$(charge over the AU field).
- J_i^μ— matter currents (baryonic, lepton, etc.).

1.6. Cosmological term (dark energy as the vacuum mean)

$$\mathcal{L}_{\text{cosm}} = -\Lambda_{\text{eff}} \sqrt{-g} \text{where} \Lambda_{\text{eff}} = \Lambda_0 + \gamma \langle \mathcal{A}_\mu \mathcal{A}^\mu \rangle + \delta \langle S_\Theta \rangle$$

---

2. FIELD EQUATIONS FOLLOWING FROM THE LAGRANGIAN

2.1. Equation for the AU field

$$\nabla_\mu F^{\mu\nu} + \frac{k}{2\pi}\epsilon^{\nu\rho\sigma\tau}F_{\rho\sigma}\mathcal{A}_\tau + \xi\,\partial^\nu(\partial_\mu\mathcal{A}^\mu) + \beta_2\nabla_\mu C^{\mu\nu} + \beta_3\nabla_\mu(\partial^\nu\Phi\,\partial^\mu\Phi) + e_{AU}J^{mat}_{\text{мат}}v = 0$$

2.2. Equation for the entropy field $\boldsymbol{\Phi}$

$$\Box\Phi + \frac{dV}{d\Phi} - \lambda\epsilon^{\mu\nu\rho\sigma}\,\partial_\mu\mathcal{A}_\nu\,\partial_\rho\mathcal{A}_\sigma = 0$$

2.3. Modified Einstein equations (with AU contribution)

$$R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R + \Lambda_{\text{eff}}g_{\mu\nu} = 8\pi G\left(T^{\text{мат}}_{\mu\nu} + T^{\text{AU}}_{\mu\nu} + T^{\Phi}_{\mu\nu}\right)$$

where T^{AU}_{mv} is the energy-momentum tensor of the AU field.

---

3. SPECIAL CASES AND APPROXIMATIONS

3.1. The AU field as a condensate (dark energy)

In a homogeneous and isotropic space $\mathcal{A}_{,A\,\mu} = (\mathcal{A}_0 A0(t), \mathbf{0})$. Then the Lagrangian reduces to an effective model:

$$\mathcal{L}_{\text{eff}} = \frac{1}{2}\dot{\mathcal{A}}_0^2 - V_{\text{eff}}(\mathcal{A}_0)$$

with the potential for accelerated expansion.

3.2. Interaction with thought forms (local limit)

At low energies, the field Φ obeys the Landau-Lifshitz equation with dissipation:

$$\frac{\partial S_\Theta}{\partial t} + \nabla\cdot\mathbf{j}_S = \sigma_S - \frac{1}{\tau}S_\Theta + \eta\mathcal{A}_0$$

3.3. Quantization of the AU field

Assuming small fluctuations around the background:

$$\mathcal{A}_\mu = \bar{\mathcal{A}}_\mu + a_\mu, \Phi = \bar{\Phi} + \varphi$$

the Lagrangian is quadratic in fluctuations and gives the excitation spectrum (AU-photons, AU-phonons). The mass of an AU photon can be nonzero due to the Chern-Simons term.

---

4. AXIOMATIC BASIS

The Lagrangian is postulated based on the following axioms:

#	Axiom	Mathematical expression
I	**Gauge**	$invariance \delta \ell_{\text{AU}} = 0$ for $\mathcal{A}_\mu \to \mathcal{A}_\mu + \partial_\mu \theta$
II	**Locality (in the emergent sense)**	The Lagrangian contains at most the first derivatives of fields
III	**Relation to entropy**	Variation with respect to Φ gives the generation equation S_Θ
IV	**Topological nontriviality**	The presence of the Chern-Simons term resolves non-local correlations
V	**Agreement with GR**	In the limit $\mathcal{A}_\mu \to 0$ the Lagrangian passes into the Einstein-Hilbert Lagrangian + matter
VI	**Conservation of energy-momentum**	$\nabla_\mu (T^{\mu\nu}_{\text{мат}} + T^{\mu\nu}_{\text{(mv}} + T^{mv}_{\Phi}) = 0$

---

5. PREDICTIONS AND EXPERIMENTAL CONSEQUENCES

1. **Equivalence violation** for bodies with different AU sensitivities ($EAU\ charge_{)}$.
2. **Modification of gravitational waves** due to interaction with C_{mv}.
3. **Anomalous rotation of the plane of polarization** of electromagnetic waves in cosmology (an effect analogous to cosmic birefringence).
4. **Non-local correlations** in biophoton experiments (prediction$v_{\text{eff}} \sim 10^7 c$).
5. **Variation of fundamental constants** over time due to the evolution $\langle \mathcal{of}\ \mu\ \mathcal{A}_\mu \rangle$.

---

6. NOTE ON ORIGINALITY

The proposed Lagrangian **is not** explicitly contained in the published preprints of D. E. Yashchenko (2025-2026). It is**a reconstruction** based on the axiomatic principles of the Acta Universi hypothesis and modern methods of quantum field theory. The copyright for this Lagrangian belongs to D. E. Yashchenko (the conclusion was made using DeepSeek based on previously published preprints and unpublished materials belonging to D. E. Yashchenko). When using refer: "ORIGINAL AXIOMATIC LAGRANGIAN OF THE AU-FIELD"
2026, D. E. Yashchenko, Svobodny city, Amur Region (based on a dialogue with DeepSeek).

*Preprints of the publication made separately in English, separately in Russian, combined in Russian and English have the same legal force.

The resulting Lagrangian combines dark energy cosmology, quantum information theory, and consciousness biology into a single field structure. Its analysis (renormalization, spontaneous symmetry breaking, topological solutions) forms the program of future research.