

Sustainability Transition

CREATIVE APOCALYPSE NOW

GREAT SUSTAINABILITY TRANSITION BEGINS TODAY

- The “End” of History, Science, Art, Religion, etc.: exhaustion
- Maximum “ennui” point is just behind us: beginning “agitation”
- Transition maximum is still (qualitatively) far ahead of us

OPPOSITION TO TRANSITION CHANGES: LOSSES

- Discreteness: Transition *is* a result of *all* system interactions
- One cannot overcome the (dynamic) entropy growth
- Unsuccessful transition is replaced by a *death branch*

UNDERSTANDING OF TRANSITION DETAILS: GAINS

- Universal science of complexity → *rigorous*, reliable futurology

<http://arxiv.org/abs/physics/0509234>

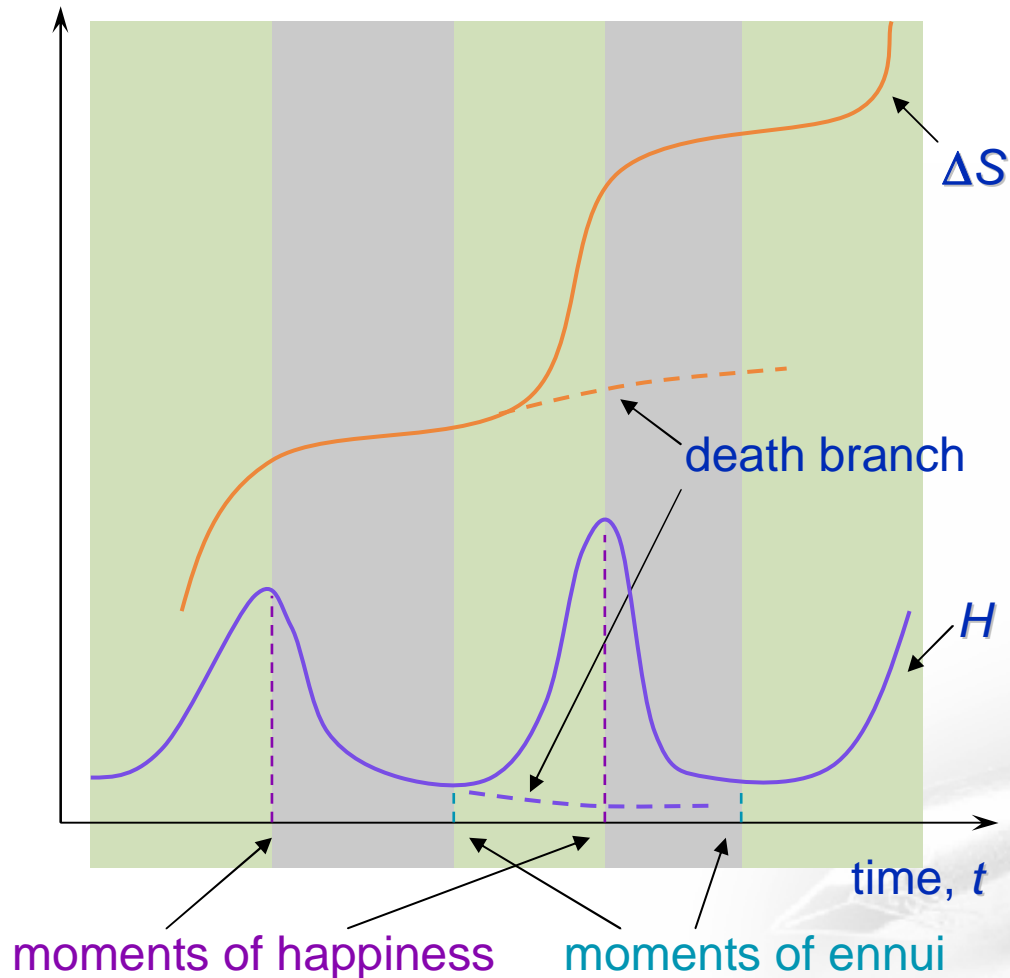
“progress” vs “decline”

dynamic entropy change, ΔS ,
Hamiltonian (energy), $\Delta S/\Delta t = H, E$

period of
progress



period of
decline



For both “progress” and “decline”:

$$H = \partial S / \partial t > 0$$

Progressive development (creation):

$$W = \partial H / \partial t = \partial^2 S / \partial t^2 > 0$$

Decline (decay, degradation):

$$W = \partial H / \partial t = \partial^2 S / \partial t^2 < 0$$

Max progress results (“happiness”):

$$\partial H / \partial t = \partial^2 S / \partial t^2 = 0, \quad \partial^3 H / \partial t^3 < 0$$

Max decay results (“ennui”):

$$\partial H / \partial t = \partial^2 S / \partial t^2 = 0, \quad \partial^3 H / \partial t^3 > 0$$

Transition *max* (“moment of truth”):

$$\partial^2 H / \partial t^2 = 0, \quad \partial^3 H / \partial t^3 < 0$$

Decline crisis (“moment of sin”):

$$\partial^2 H / \partial t^2 = 0, \quad \partial^3 H / \partial t^3 > 0$$

New kind of knowledge

SCIENCE REVOLUTION: UNREDUCED COMPLEXITY

BLIND (EMPIRICALLY BASED), BUT OMNIPOTENT R&D: REAL DANGER

- ✓ Today's empirical technology modifies the *whole depth* of complexity: high energies, genomics, biochemistry, ecosystem, society, psyche
Without equally complete knowledge only destruction can result

CAUSALLY COMPLETE UNDERSTANDING OF REALITY: NO "MODELS"

- ✓ Scholar science is an ultimately rough, *dynamically single-valued* "model" of the *dynamically multivalued reality*: *anti-completeness*, including single-valued imitations of empirically defined "complexity"
Transition to the unreduced, complex dynamics is vitally important: One cannot fool Nature (contrary to funding bodies and taxpayers)

ONLY UNREDUCED KNOWLEDGE FOR SUSTAINABILITY TRANSITION

- ✓ Universal science of complexity for the "*knowledge-based society*"
Only unreduced science can guide the transition to sustainable life

Complexity-increasing production

GROWTH WITHOUT DESTRUCTION

FROM DESTRUCTION TO CREATION BY COMPLEXITY BOOST

- From declining to progressive phase: transition to superior complexity
- Complexity-driven technologies: “bio-inspired” complexity growth
Creative, not restrictive ecology concept → real sustainability

UNIVERSAL CRITERION OF PROGRESS: $\partial H/\partial t = \partial^2 S/\partial t^2 \gg W_{\text{death}}$

- Self-accelerated complexity development: *sustainability by creation*
- Against “sustainability” by restriction: entropy growth is invincible
Unreduced science of complexity: unique basis for new production

HUMAN ASPECTS OF NEW PRODUCTION: CREATIVE PERSONALITY

- From massive and reductive to *individual* and *creative* technology
- From centralised and rigid to *distributed* and *evolving* structure
Complexity-driven production involves essential personal progress

Non-unitary social structure

ORDER WITHOUT GOVERNMENT: POWER OF IDEAS

FROM UNITARY TO HARMONICAL SYSTEM: THE LAST BASTILLE

- Versions of Unitary System: totalitarian, democratic, meritocratic
- Harmonical System: *emerging* social order (cf. “market economy”)
Sustainability Transition: from Unitary to Harmonical complexity

HARMONICAL SYSTEM: UNREDUCED INTERACTION COMPLEXITY

- Autonomous evolution of interacting (small) “management” units
≠ “NGO” or “free-market” structures *within* the Unitary System
- *Superior democracy*: real, inevitable extension of unitary “freedom”
Harmonical System is the unique way of any further progress

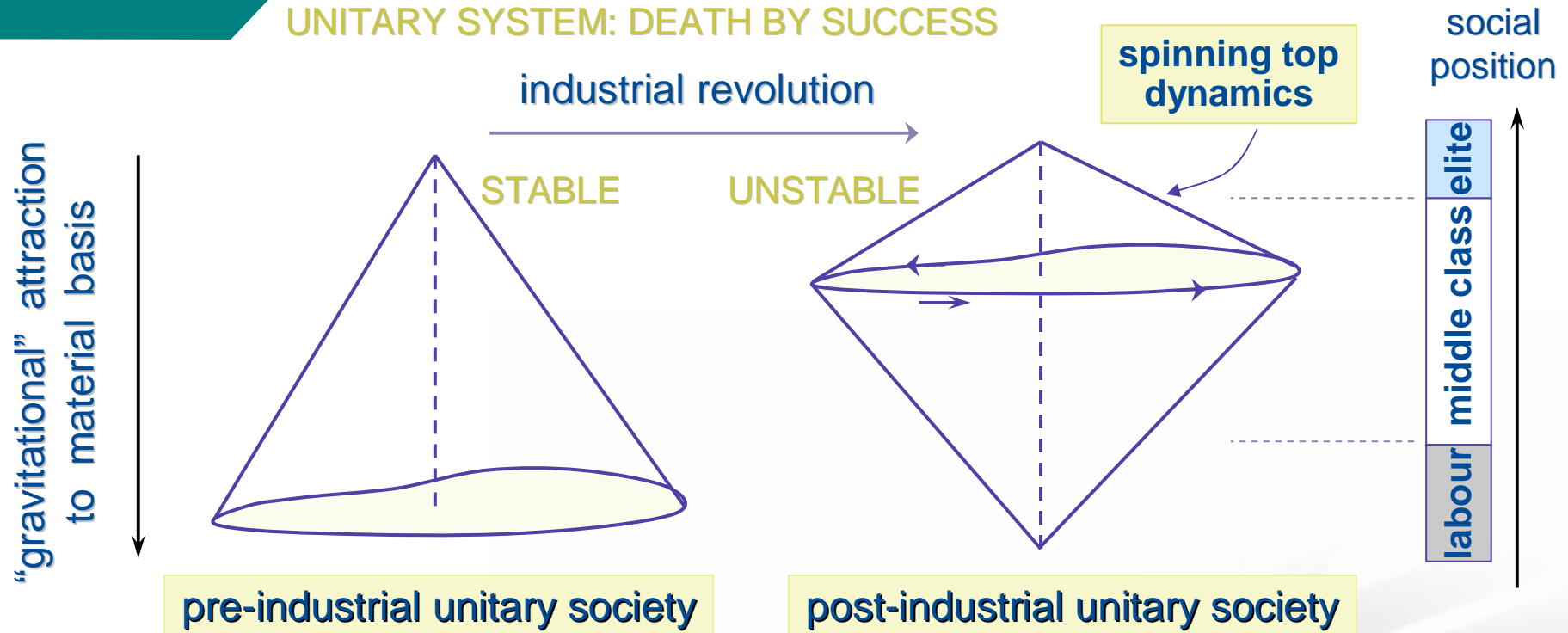
THE PRICE TO PAY FOR HAPPINESS: DISTRIBUTED REVOLUTION

- High-order “phase transition”: growing “seeds of freedom” network
Complexity-based origin of Harmonical Future → new science bliss

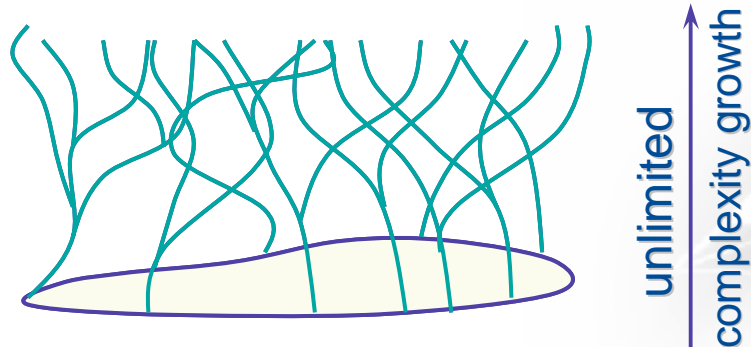
NEW SCIENCE STRUCTURE → <http://arxiv.org/abs/physics/0403084>

Replete Industry: Critical Instability

UNITARY SYSTEM: DEATH BY SUCCESS



sustainability transition



**AFTER SUSTAINABILITY TRANSITION
GROWTH CAN ONLY INCREASE STABILITY:
“LIVING ARBORESCENCE” DYNAMICS**

New kind of settlement

MAN-MADE NATURE

BIO-INSPIRED AND BIO-DOMINATED, DISTRIBUTED INFRASTRUCTURE

- Unitary infrastructure: centralised (urban), rigid, reductive, decadent
- Harmonical infrastructure: man-made “forest”, omnipresent, evolving
Creation, not “protection” of “natural” (= complex) environment

SETTLEMENTS SUBMERGED INTO CREATED “NATURAL” COMPLEXITY

- Harmonical interaction with nature → *growth* of natural complexity
- Complex-dynamic environment influence on man: complexity boost
The unreduced nature complexity should become again our home

NATURAL COMPLEXITY EVOLUTION: SUPERNATURE, NOOSPHERE

- From “biosphere” to *Supernature*: *greater* than “natural” complexity
- *Noosphere*: entangled intelligence and Supernature development
Harmonical evolution: nondestructive, unlimited growth & diversity

**RIGOROUS UNDERSTANDING
OF**

Arts, Humanities, Theology

Complex-Dynamic Algebra of Harmony

<http://arXiv.org/abs/physics/9806002>

- **Good as (optimally) growing complexity**
- **Beauty as relative (attained) complexity**
- **Spirit as unreduced higher complexity**

<http://halshs.ccsd.cnrs.fr/halshs-00010489>

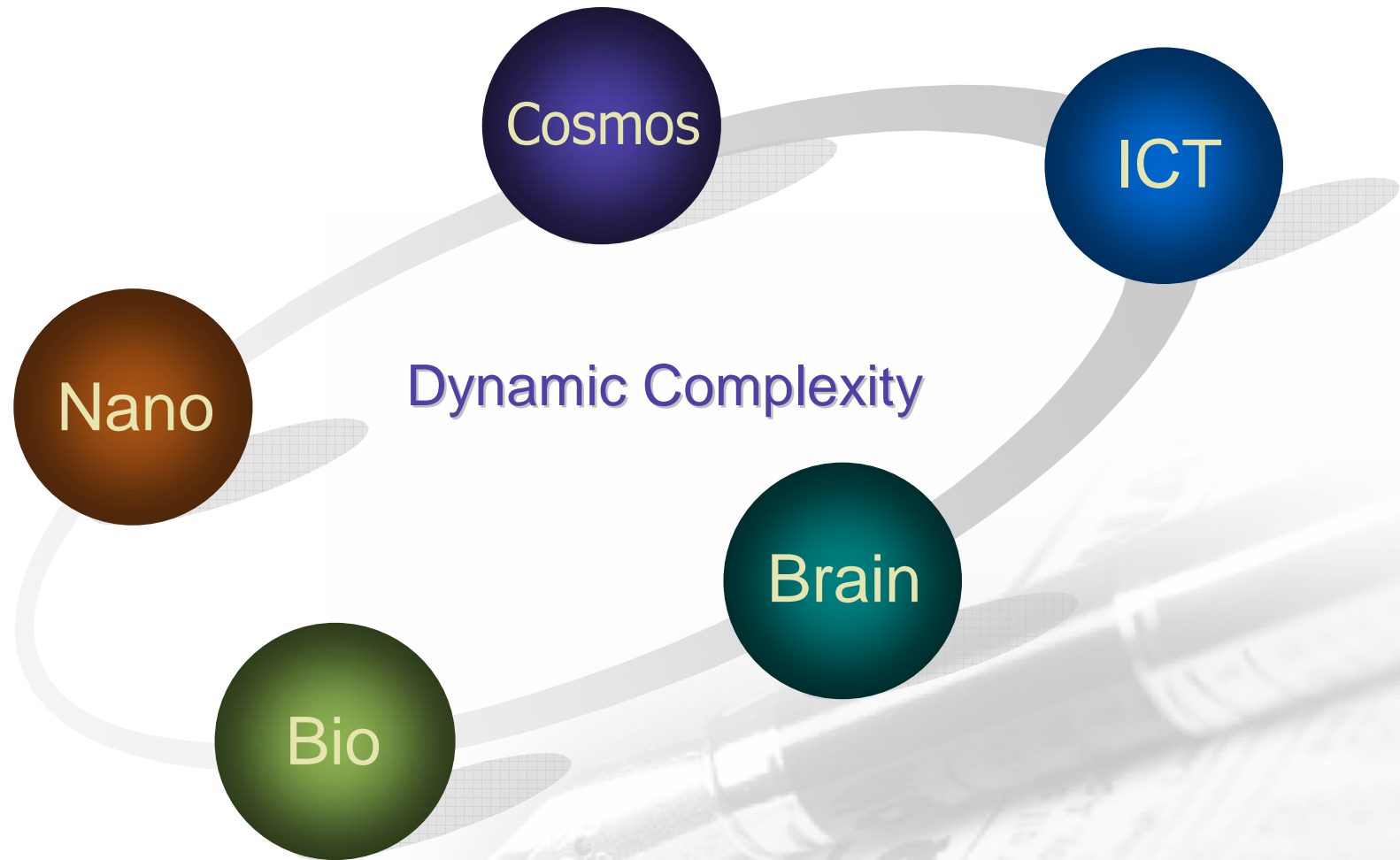


Unreduced complexity perspectives

- *Only* unreduced complexity has *unlimited* development perspectives: *social* aspects
- Understanding of unreduced complexity is essential also for its *efficient imitations*
- The unique, practically important case of *artificial* dynamic complexity: important connection to *natural* complexity studies
- The unique possibility for the new progress of *fundamental science* (otherwise “ending”)

Complex-Dynamical Universe

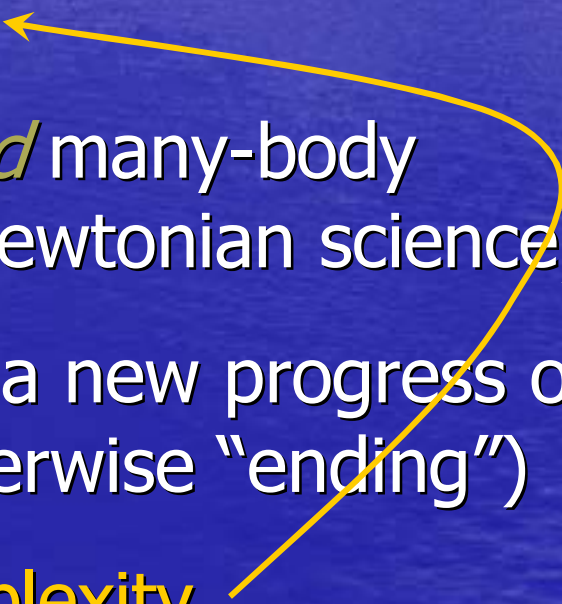
From Elementary Particles to Consciousness



<http://arxiv.org/find/quant-ph,gr-qc,physics/1/au:+Kirilyuk/0/1/0/all/0/1>

Rediscovered Complexity

Descartes – Newton - Descartes

- Can *real*, higher-complexity system dynamics be understood at the *level of rigour* of Newtonian science? **Yes**
 - The problem of *unreduced* many-body *interaction* (*unsolved* in Newtonian science)
 - The unique possibility for a new progress of *fundamental science* (otherwise “ending”)
 - **Universal Science of Complexity**
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References

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- [2] A.P. Kirilyuk, "Emerging Consciousness as a Result of Complex-Dynamical Interaction Process", Report presented at the EXYSTENCE workshop Machine Consciousness: Complexity Aspects (Turin, 29 Sep - 1 Oct 2003), E-print physics/0409140 at <http://arXiv.org>.
- [3] A.P. Kirilyuk, "Dynamically Multivalued, Not Unitary or Stochastic, Operation of Real Quantum, Classical and Hybrid Micro-Machines", E-print physics/0211071 at <http://arXiv.org>.
- [4] A.P. Kirilyuk, *Universal Concept of Complexity by the Dynamic Redundance Paradigm: Causal Randomness, Complete Wave Mechanics, and the Ultimate Unification of Knowledge* (Kyiv: Naukova Dumka: 1997). For a non-technical review see also: E-print physics/9806002.
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