

New Cosmology, New Religion

October 21, 2021



Cosmology and Religion

- ▶ Our most deeply held, unconscious set of assumptions and values
- ▶ *Religare* – to reconnect; to bind
- ▶ That which determines our expectations, frames the questions we ask, and structures our approach to what we do.

Cosmology, Consciousness and Religion

Pre axial

Tribal
Mythic
Ritualistic
Communal

Flat earth

Axial Period

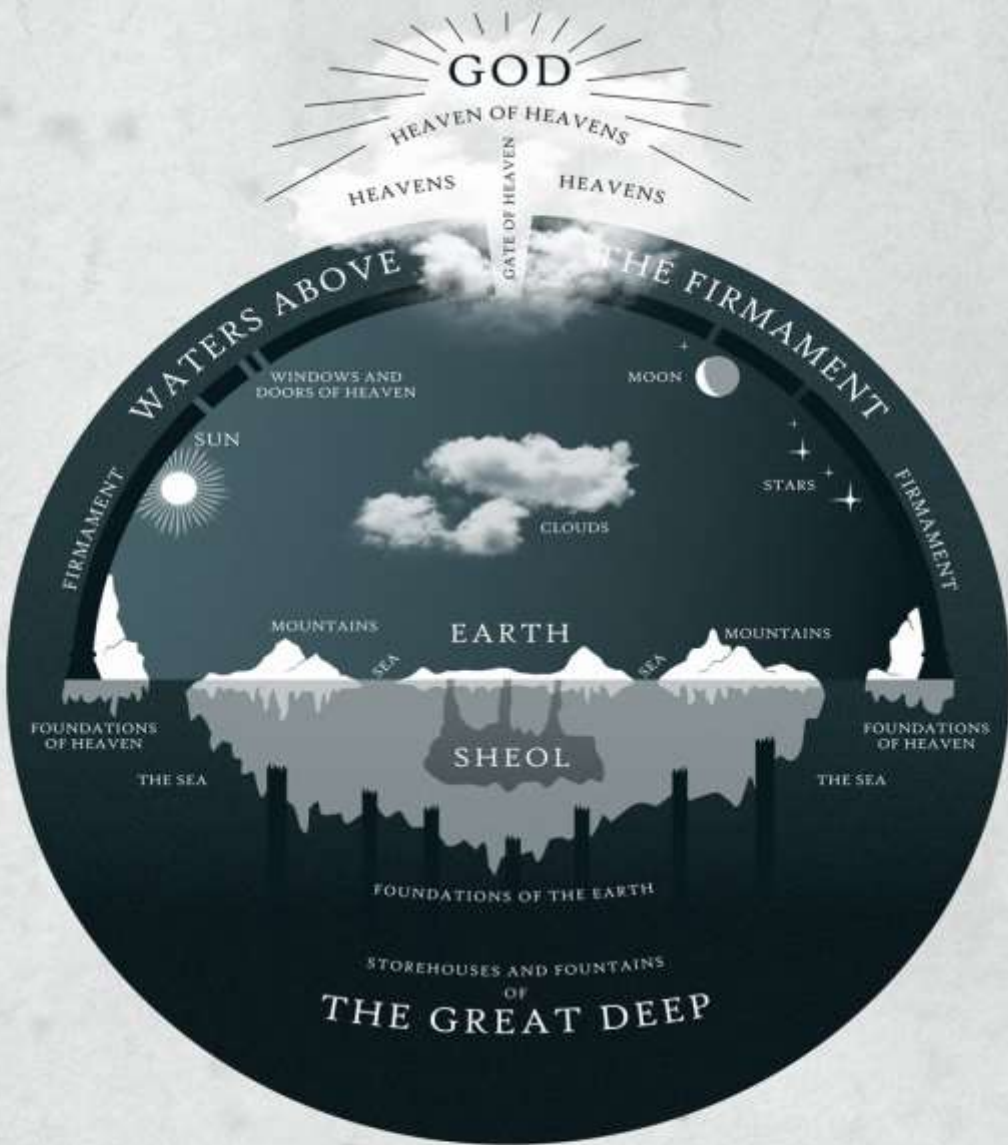
autonomy
transcendence
freedom
person

Geocentric

Second Axial

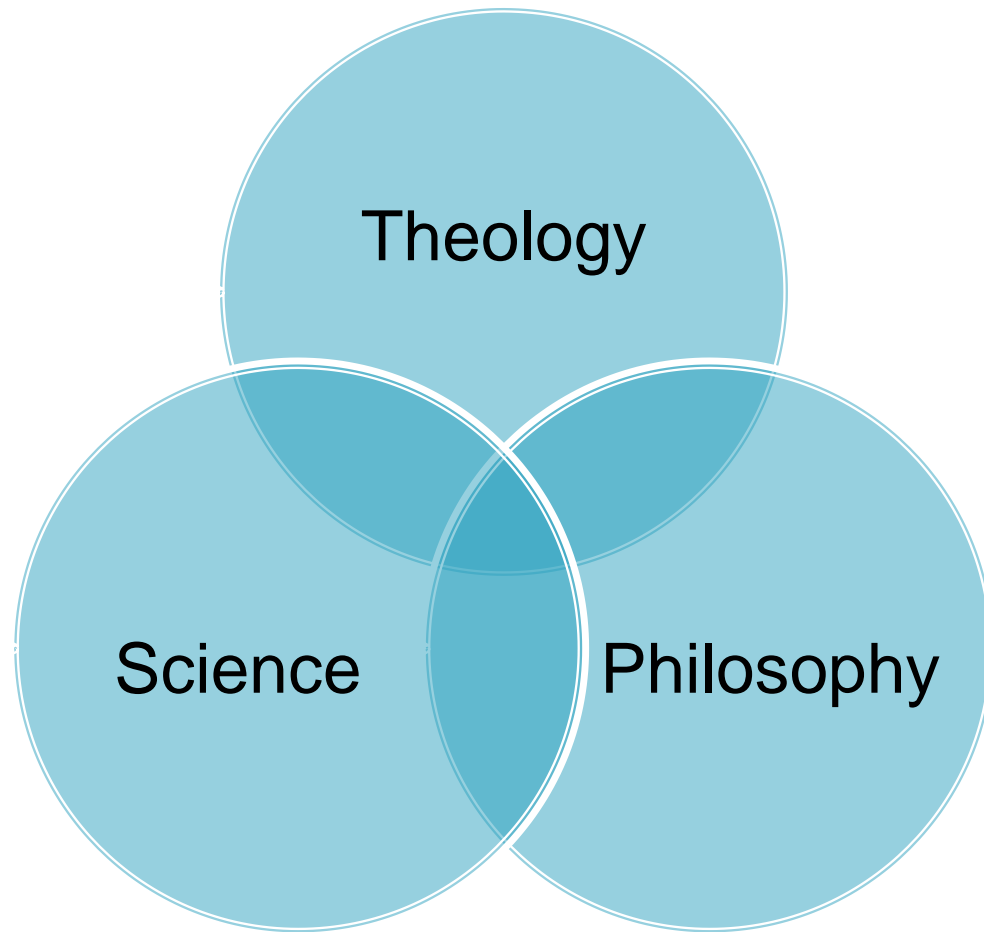
relatedness
immanence
ecological
global community

Big bang



THE ANCIENT HEBREW CONCEPTION OF THE UNIVERSE

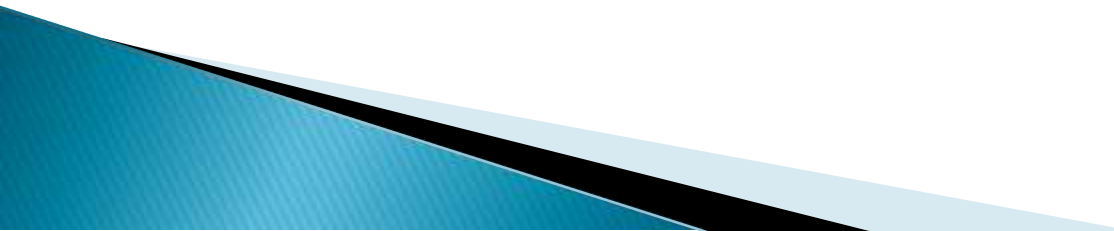
TO ILLUSTRATE THE ACCOUNT OF CREATION AND THE FLOOD



Theology

Science

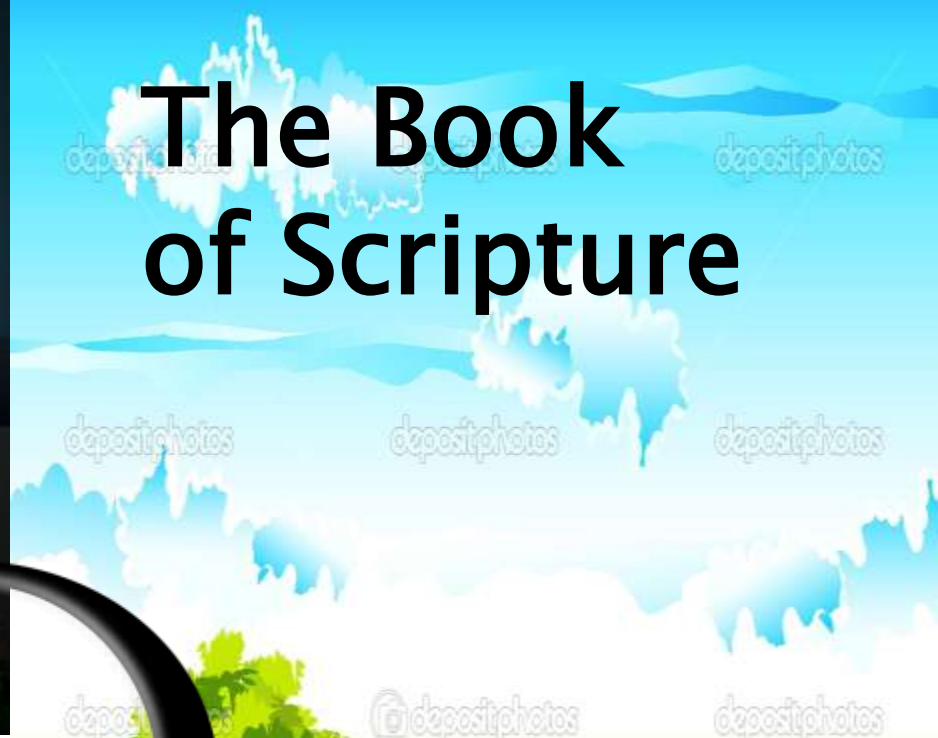
Philosophy

- ▶ **Theology occupied the highest place in the sciences**
 - ▶ **Harmonious unity of cosmology, anthropology and theology**
 - ▶ **Creation = work of order**
 - ▶ **God of order is known from order of the world.**
 - ▶ **Sin = disturbance of order or disorder.**
- 

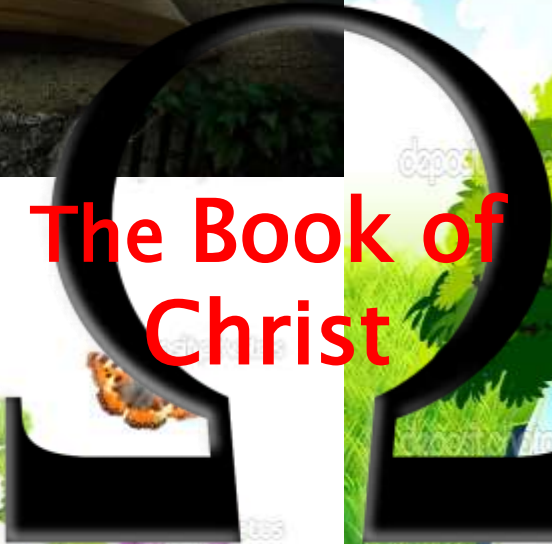
The Book of Nature

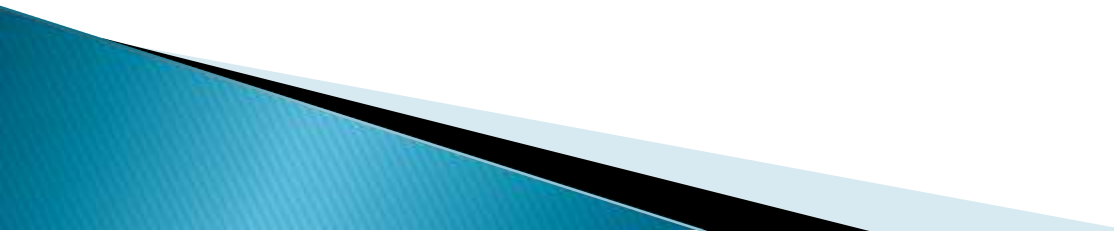


The Book of Scripture



The Book of Christ



- ▶ **Universe is a theophany or manifestation of God**
 - ▶ **Macrocosm and microcosm perfectly attuned to each other -- 'machina mundi.'**
 - ▶ **Sin affects entire cosmos -- everything becomes disordered**
 - ▶ **Redemption = return to original world order**
- 

SPIRIT

Matter



God

Angel

Heaven

Human

Beast

Plant

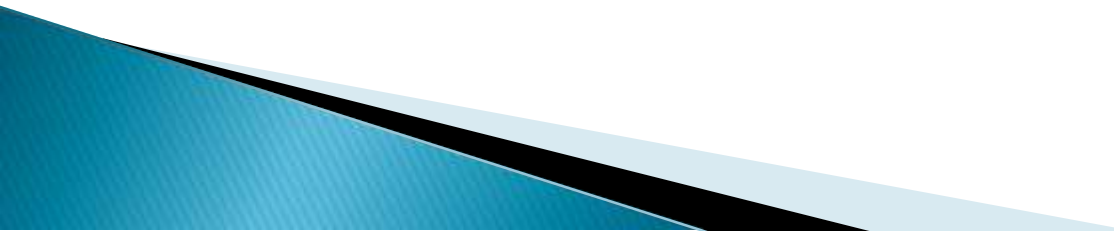
Flame

Stone

Essence

Existence

The ladder of intellect

- ▶ **Order and hierarchy reflected God's wisdom and omnipotence both in natural and supernatural order.**
 - ▶ **Grace perfects nature – pertains only to humans**
 - ▶ **World is created for human so that entire cosmic order is aimed toward God.**
- 

Galileo and the Two World Systems

“Dialogue Concerning the Two Chief World Systems.” (1632)



DIALOGO
DI
GALILEO GALILEI LINCEO
MATEMATICO SOPRAORDINARIO
DELLO STUDIO DI PISA,
E Filosofo, e Matematico primario del
SERENISSIMO
GR.DUCA DI TOSCANA.
Dossi ne i congressi di quattro giornate li dilette
super i due
MASSIMI SISTEMI DEL MONDO
TOLEMAICO, E COPERNICANO,
Proposti indistintamente a ragione Filosofica, e Natural
tutti per l'una, quanti per l'altra parte.
CON FRI. VIBGI.
IN FIRENZA, Per Gio: Batista Landini MDCXXXII.
OMNIBUS LIBRARIIS ANTIQVAE

*“The Bible tells us how to go to heaven,
not how the heavens go.”*

Cardinal Baronius

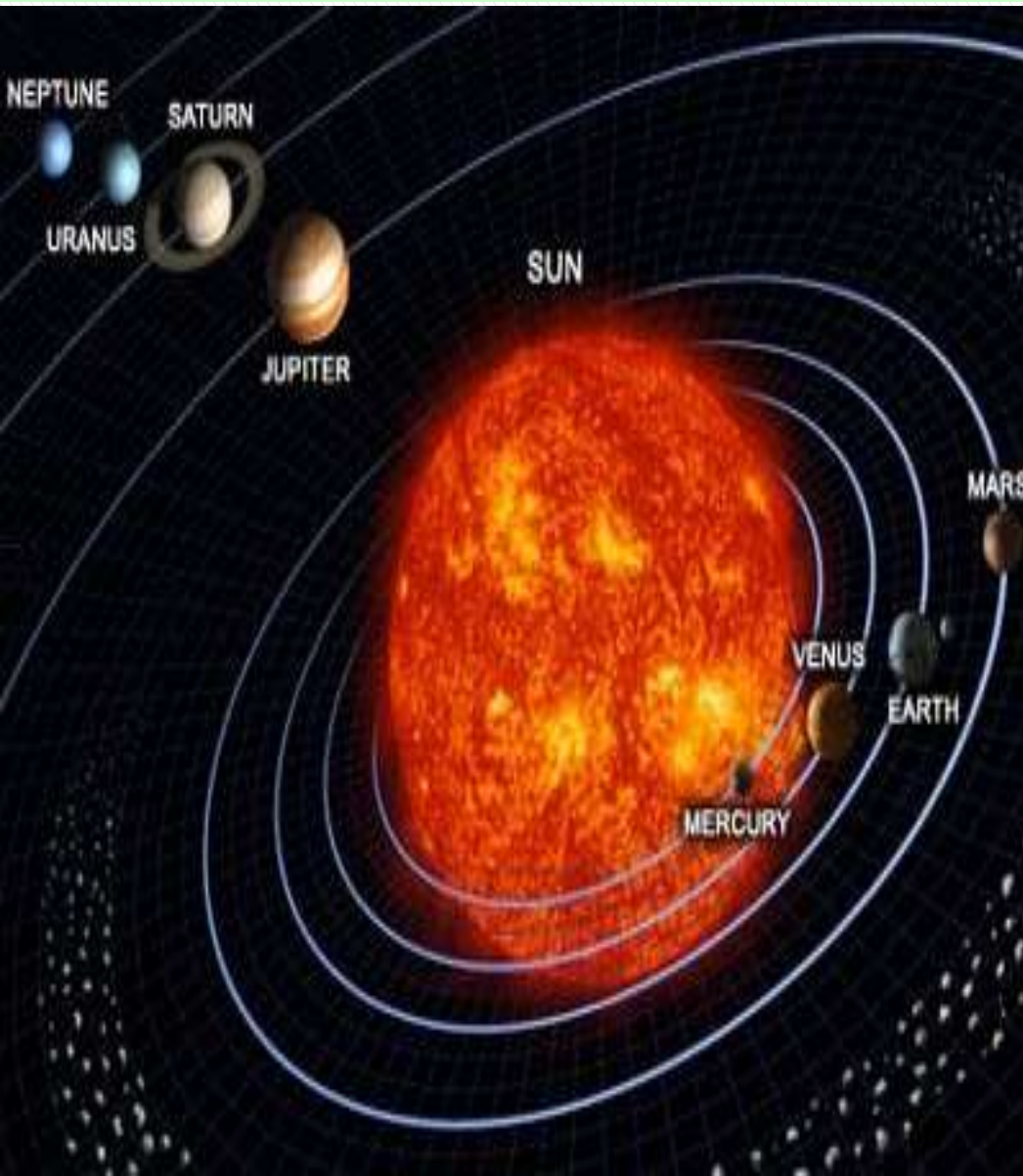
Descartes' Dualism

World of Ideas (Mental world)

Cogito ergo sum

World of Matter (physical world)

Rise of Modern Science



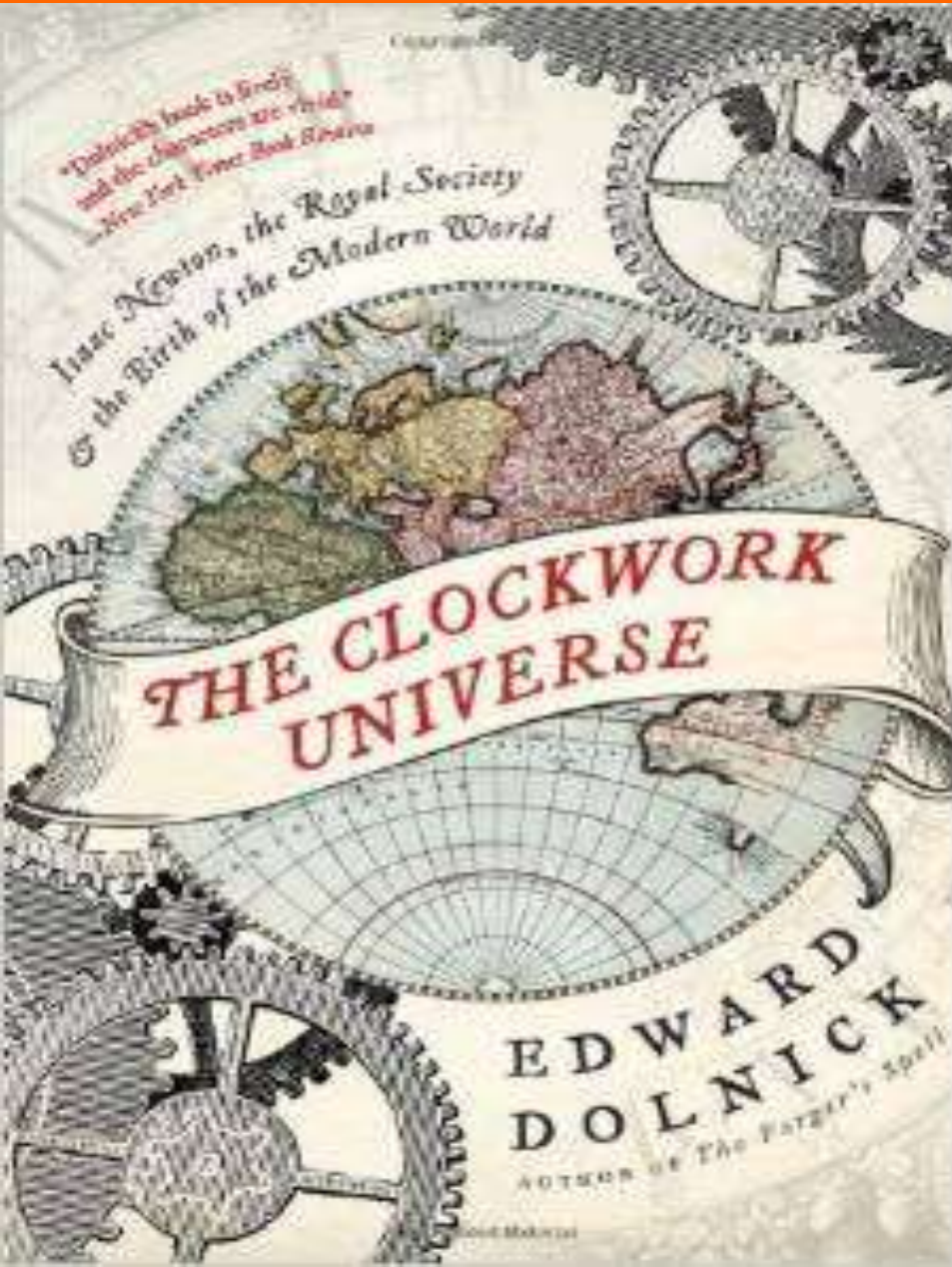
- ▶ **Modern science brought with it the conquering of space**
- ▶ **God was pushed out of the cosmos as an “unnecessary hypothesis.”**

Space of Transcendence



- ▶ The medieval Christian world picture had both a physical and spiritual realm.
- ▶ It incorporated a space for the body and a space for the soul.

SPATIAL SHIFTS



- ▶ By the seventeenth century, space was quantifiable leaving no room for any other kind of space to exist.
- ▶ The extension of space into the sphere of infinity gave rise to a bold new mechanistic philosophy that saw the world not as a great spiritual hierarchy but as a vast machine.
- ▶ Mind separate from matter

Mechanical Philosophy

- ▶ Paved the way for natural science to proceed to what could be quantified and measured.
- ▶ Turn to the subject: loss of transcendence.
- ▶ *The self-thinking subject replaced the cosmos creating a crisis of transcendence, that is, no real space to transcend except through money, sex, power.*

The Divided

Mind

▶ Control

passion

▶ Analysis

connectivity

▶ Detail

vision

▶ Closed

open

▶ **NARROW**

SPACIOUS



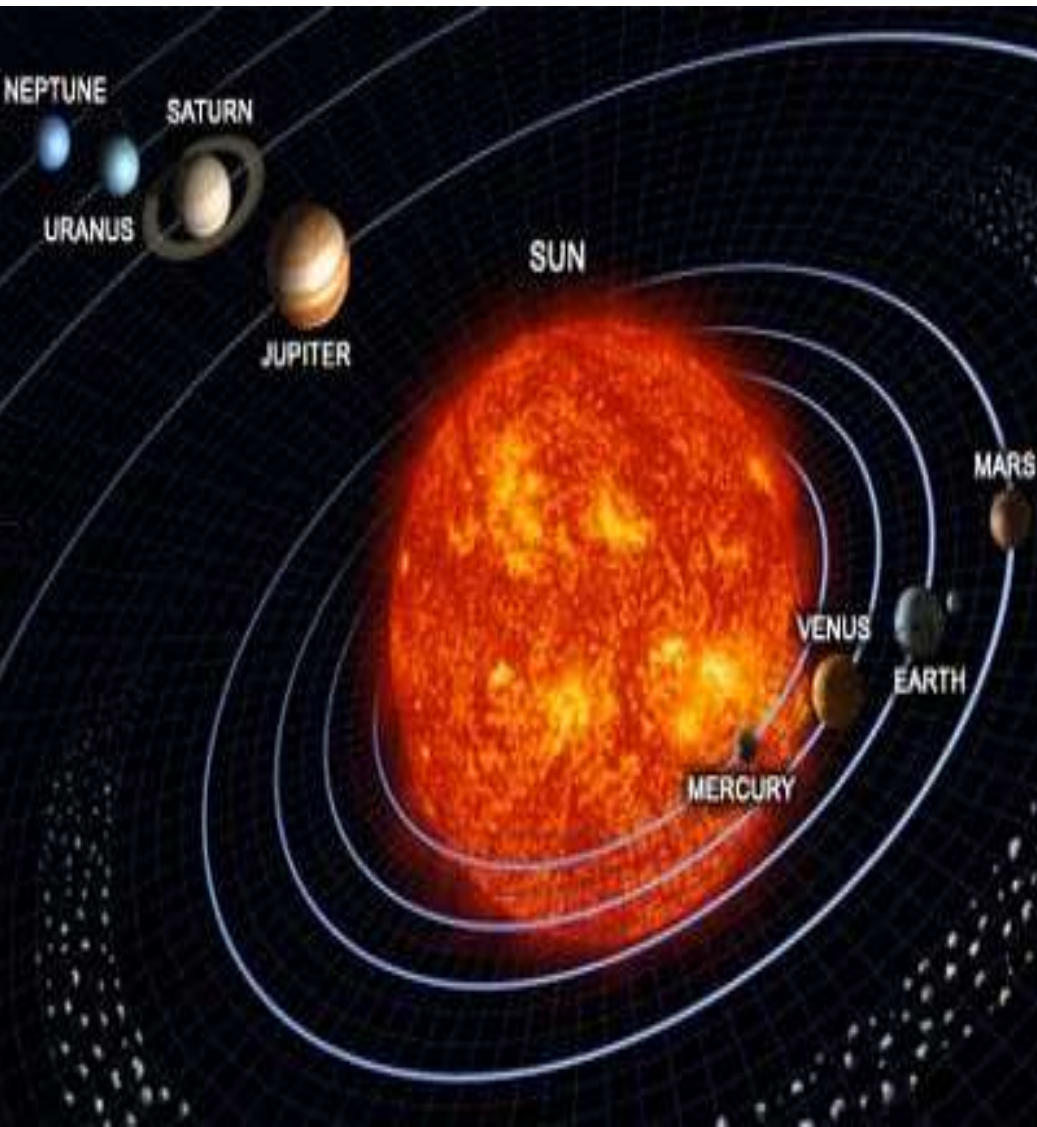
Science

- ▶ Nature
- ▶ Empirical knowledge
- ▶ Data

Religion

- ▶ Creation
- ▶ Revelation
- ▶ Human uniqueness –
image of God

Science



Religion



Newton's World



A Mechanistic World



- ▶ **Certainty**
- ▶ **Predictability**
- ▶ **Hierarchy**
- ▶ **Control**
- ▶ **Single vision**
- ▶ **Objective reality**

Lost In Space?



we

*“The artificial separation between
humans and cosmos
is at the root
of our contemporary
moral confusion.”*

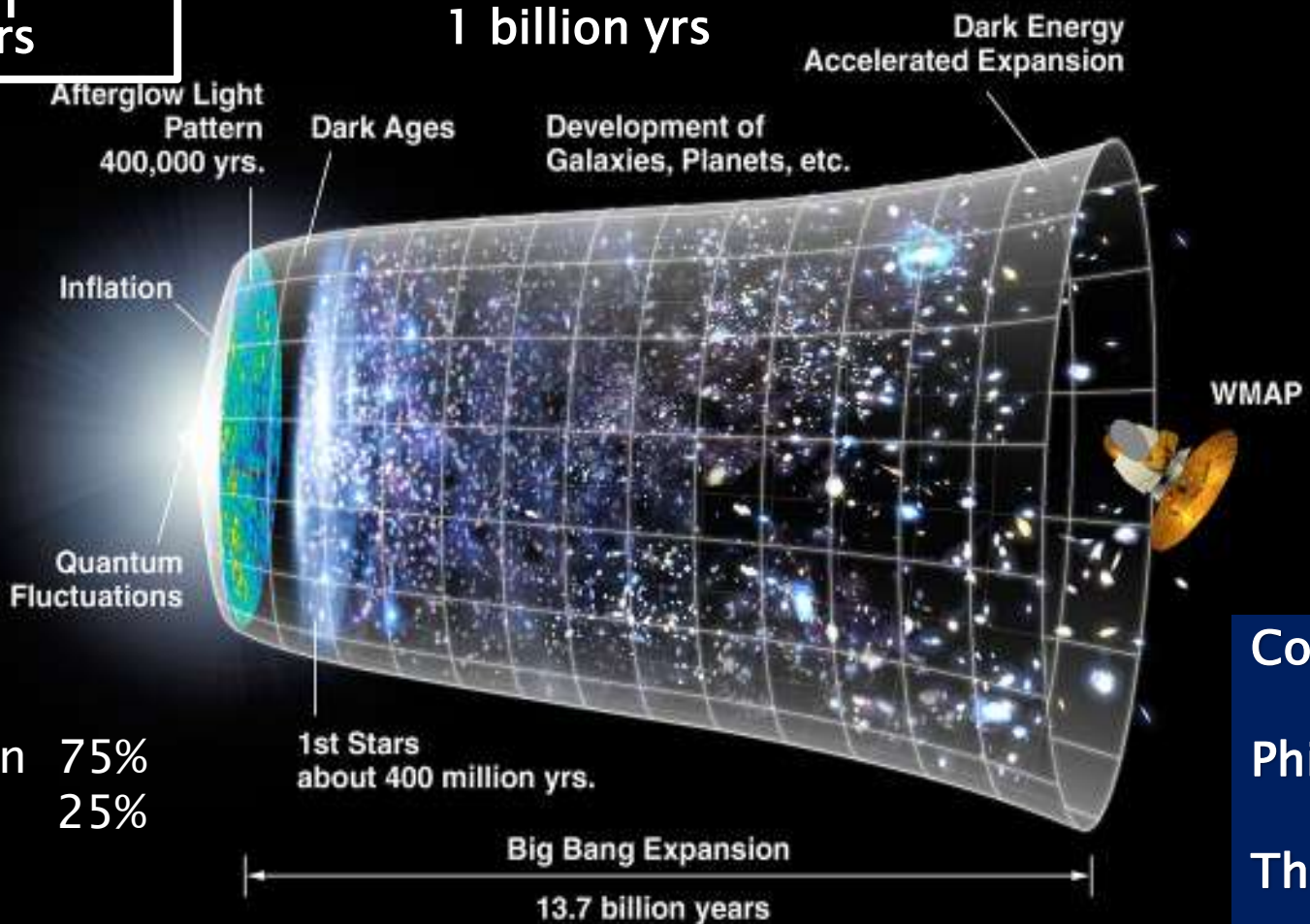
Teilhard de Chardin

Three Levels of Modern Science

- ▶ **Large – Big Bang Cosmology**
- ▶ **Small – Quantum physics**
- ▶ **Complex – Evolution**

The Hot Big Bang Cosmos

13.8 billion years



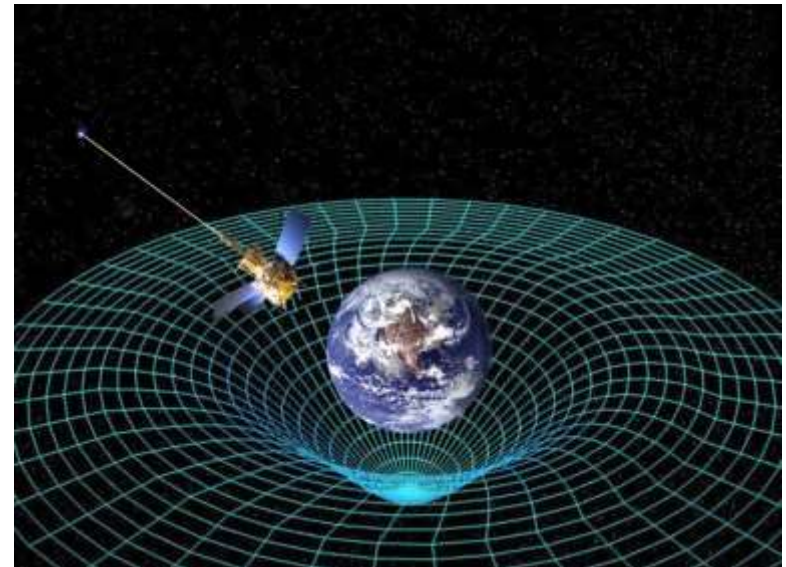
Hydrogen 75%
Helium 25%

Cosmology
Philosophy
Theology

Unfolding Space

Einstein – No absolute space or time

- ▶ **time does not flow at a fixed rate**
- ▶ **space–time is not flat but curved or "warped" by distribution of mass and energy in it.**
- ▶ **gravity acts to structure space**



Cosmic microwave background

The Expanding Universe

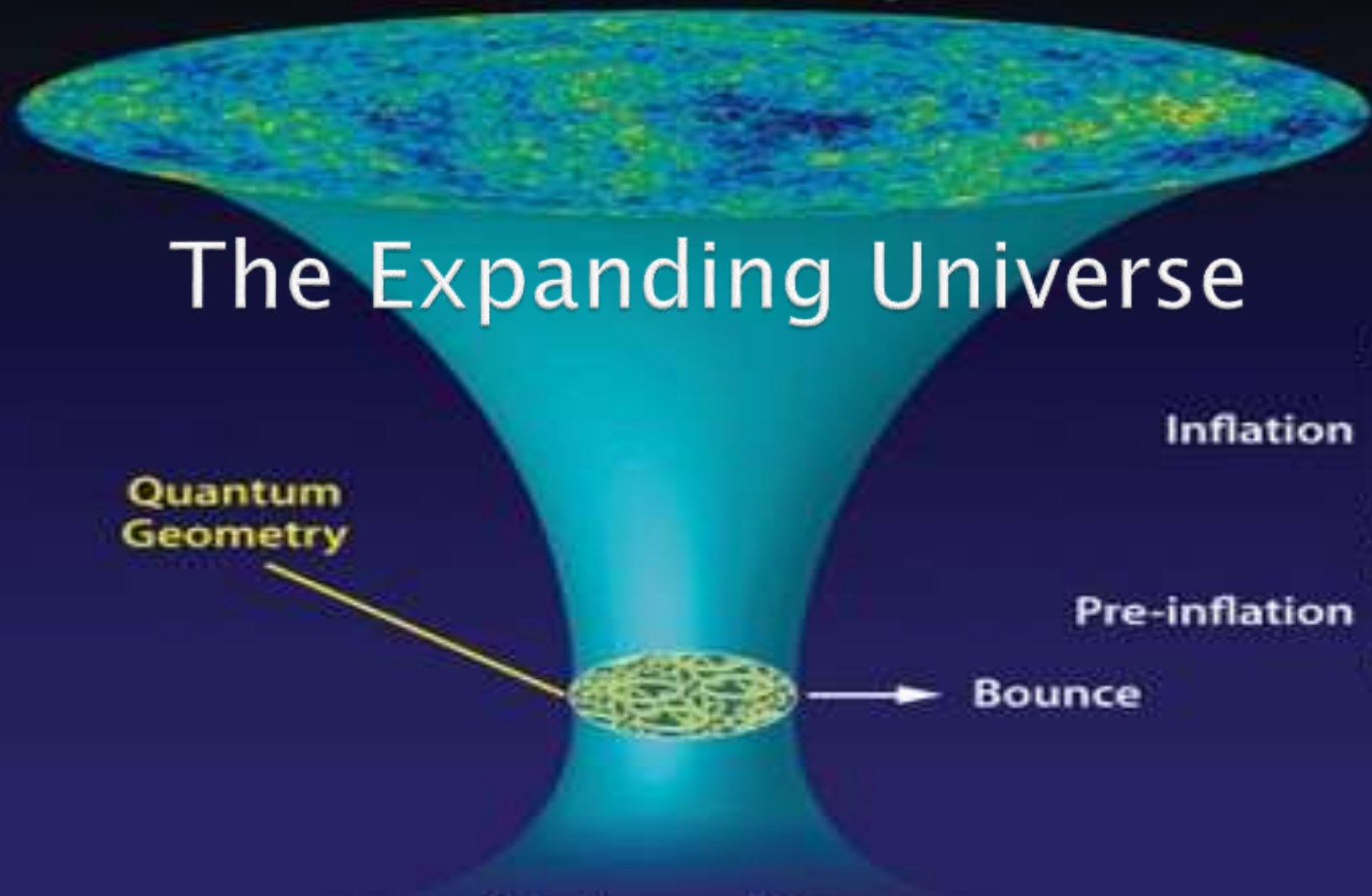
Quantum
Geometry

Inflation

Pre-inflation

Bounce

Pre-bounce Phase
of the Universe



THE LOCKHORNS

by Bunny Hoest
& John Reiner

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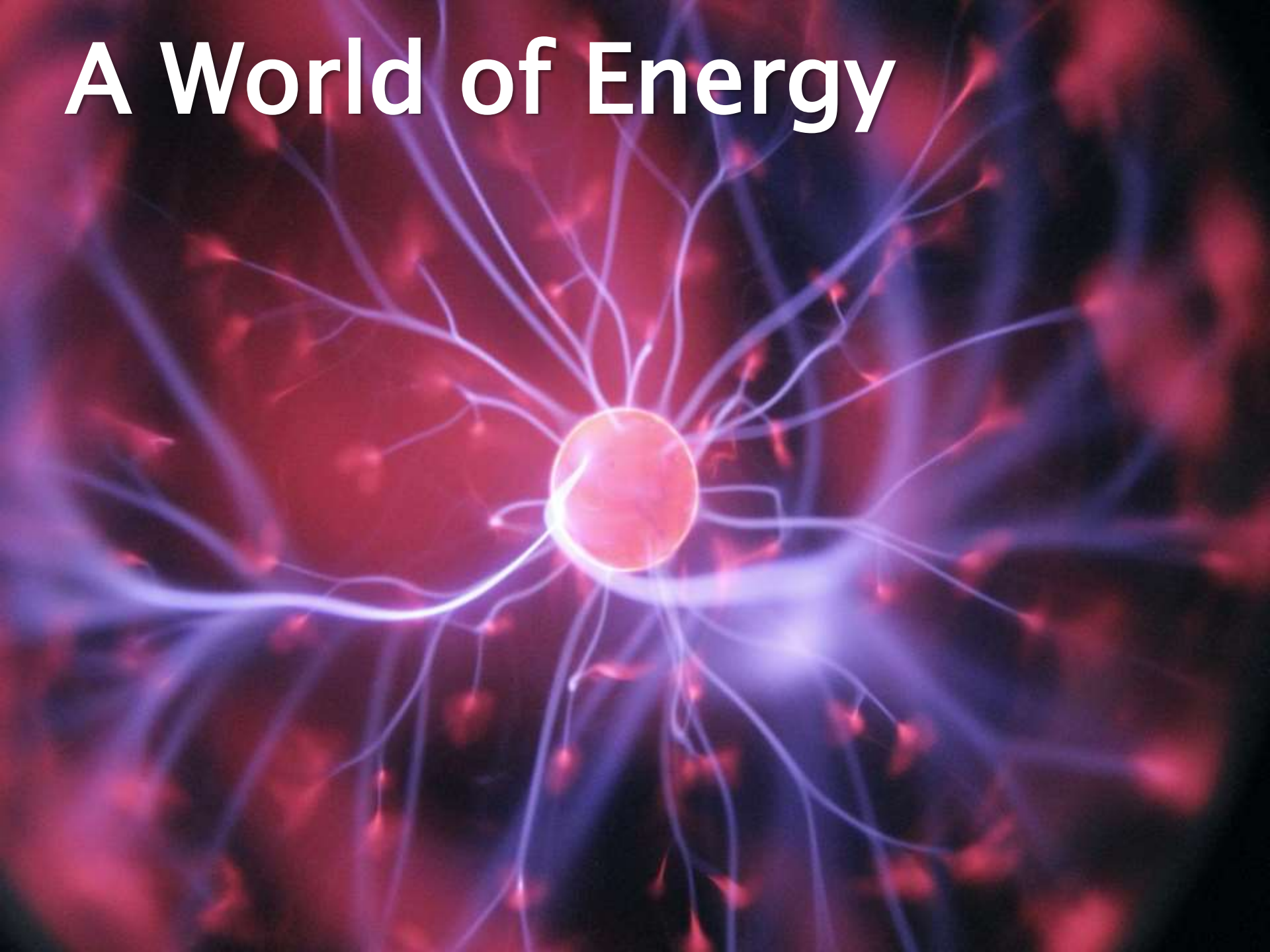
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HOEST &
REINER

"DON'T FEEL BAD, LORETTA ...
THE ENTIRE UNIVERSE IS EXPANDING."

A World of Energy



Philosophical shifts in Materiality

Aristotle

Substance

Matter

Form

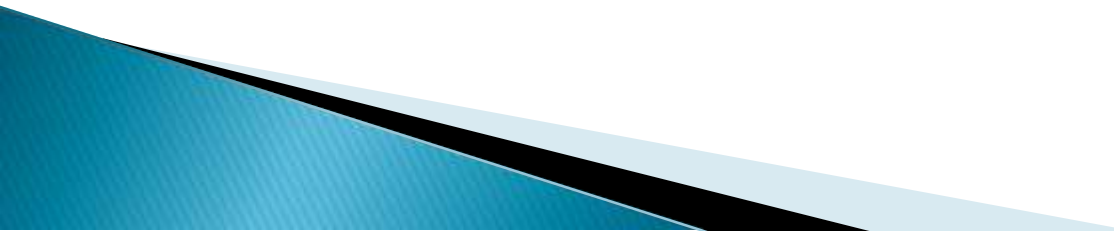
Einstein

Energy

Relatedness

Complexity

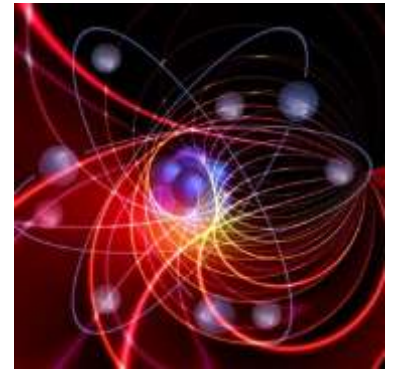
The reality of Matter

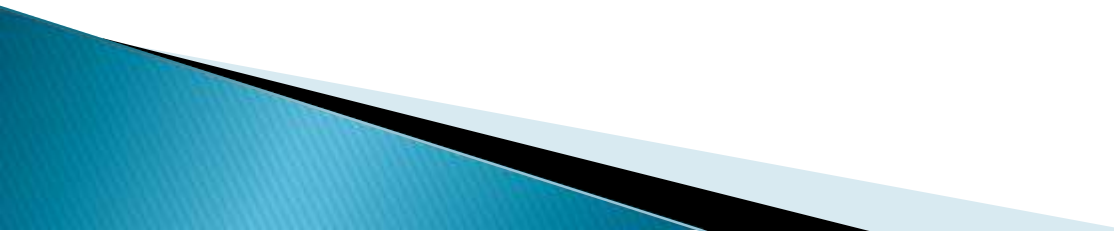
- ▶ **The basis of matter is non-material– a cosmic plenum of potentiality; superimposed states.**
 - ▶ **Electrons are standing waves or forms**
- 

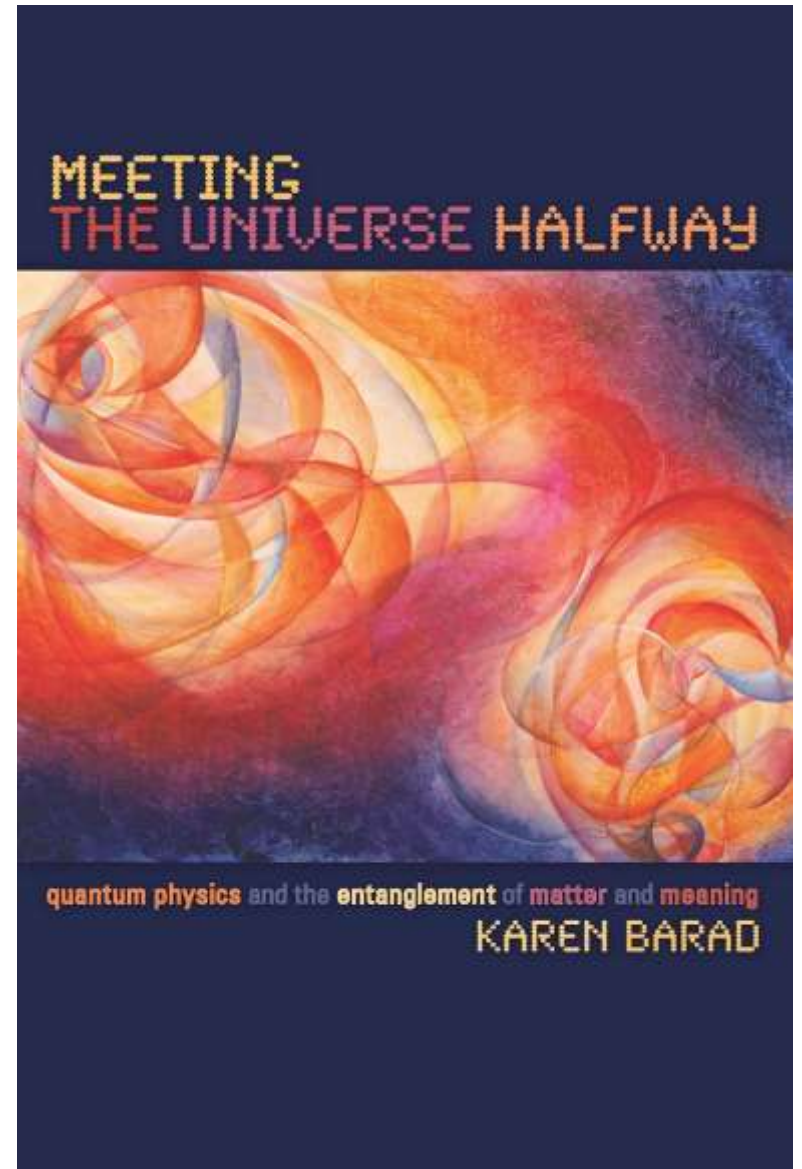
Quantum Entanglement

- ▶ Take two particles whose spins cancel each other out to zero. Separate particles by distance. If measure particle A as “up” particle B is measured “down.”
- ▶ The measurement on A does not merely reveal an already established state of B: It actually *produces* that state → entangled.
- ▶ “Non local action at a distance”

“Those who fire together wire together”



- ▶ **“Entanglement is simply another way of addressing the fact that physical reality is interconnected at the deepest levels we currently know and that there is a superposition of states that is complementary rather than contradictory,” (Barad, 146).**
 - ▶ **When particles interact, they lose their separate existence**
 - ▶ **“Once a pair of particles or a divided single particle is entangled, they remain connected no matter where in the physical universe they travel,” (Barad, 148).**
- 





Karen Barad

- Agential realism- relata do not precede relations but are the effects of intra-actions (the cutting together/apart of difference) within phenomena and are observation-dependent.
- Primary semantic units are not words but material-discursive practices.

Karen Barad: Intra- action

*“There is no ‘between’ as
such,
human and non-human
organisms
and machines
emerge only
through their mutual
co-constitution.”*

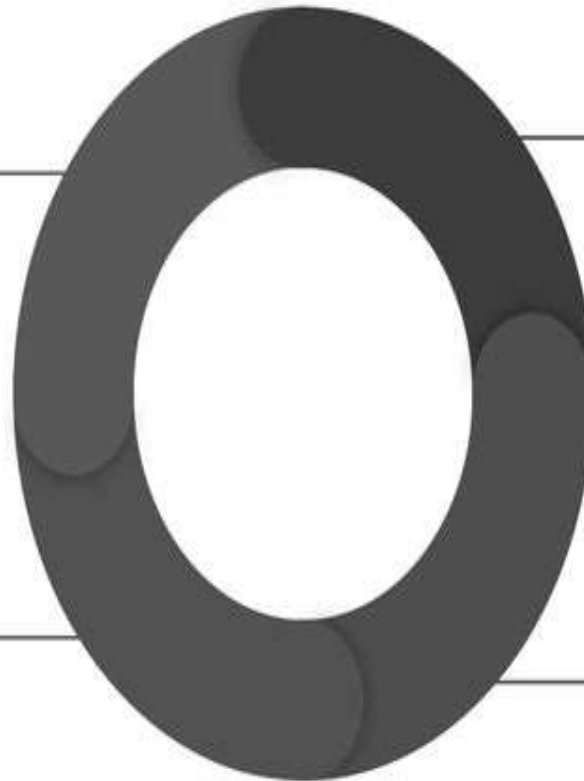
The Meaning of Agential Realism

Meaning and agency
emerge from intra-actions

Continually entangled and
reconfiguring reality and
possibility

We are ethically responsible
because our intra-actions
have significant impacts

Because we are entangled,
we are accountable for the
performativity of reality



Matter

Language has been granted too much power. The linguistic turn, the semiotic turn, the interpretive turn, the cultural turn, it seems that at every turn lately every "thing" -even materiality- is turned into a matter of language or some other form of cultural representation.

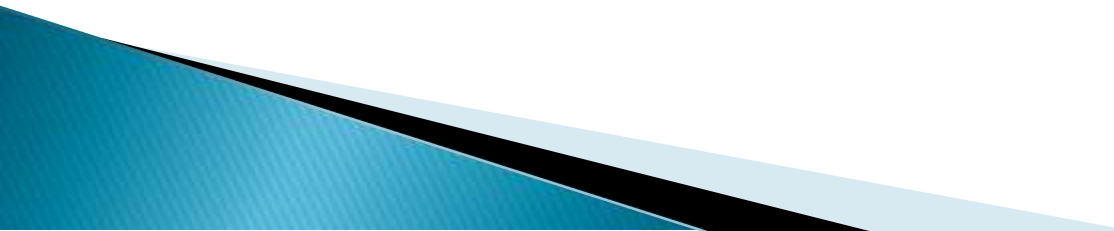
...

Language matters. Discourse matters. Culture matters. There is an important sense in which the only thing that does not seem to matter anymore is matter.

(Barad, 2003, p. 801)

From language to performativity

Cosmic Wholeness

- ▶ The discovery of non-material forms which exist in physical reality as the basis of the visible world suggests that archetypes are truly existing, real forms which can appear in our mind out of a cosmic realm.
 - ▶ The empirical world arises out of a cosmic realm of potentiality, whose forms appear as physical structures in the external world and as archetypal concepts in our mind.
- 

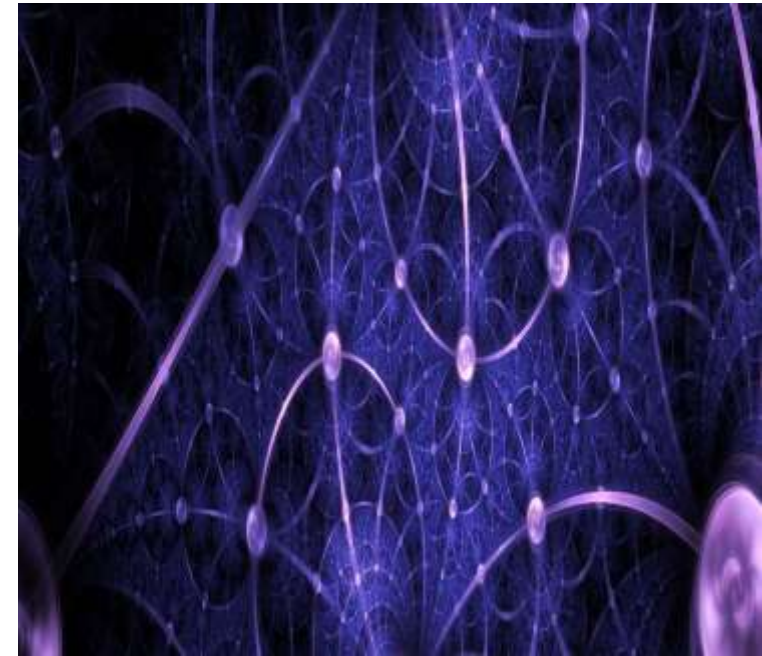
Relational Holism

If reality is nonlocal. . .then nature is not composed of material substances but deeply entangled fields of energy.

The nature of the universe is undivided wholeness.

David Bohm's Implicate Order

- ▶ Quantum world is entangled; reality is nonlocal
- ▶ looking at reality as enfolded relationships.
- ▶ bridge between the mental and the physical
- ▶ Observer and observed are indistinguishable
- ▶ Holographic



David Bohm's Implicate Order

- ▶ The notion of reality as a whole should be such as to allow for an understanding of how reality and consciousness are related.

“At each level of subtlety there will be a “mental pole” and a “physical pole”. . . But the deeper reality is something beyond either mind or matter, both of which are only aspects that serve as terms for analysis.”



**As human beings and
societies
we seem separate,
but in our roots
we are part
of an indivisible
whole
and share
in the same
cosmic process.**

David Bohm

The “Hard Problem” of Matter

“We know nothing about the intrinsic quality of physical events except when these are mental events that we directly experience.”

“In having conscious experience, we learn something about the intrinsic nature of physical stuff, for conscious experience is itself a form of physical stuff.”

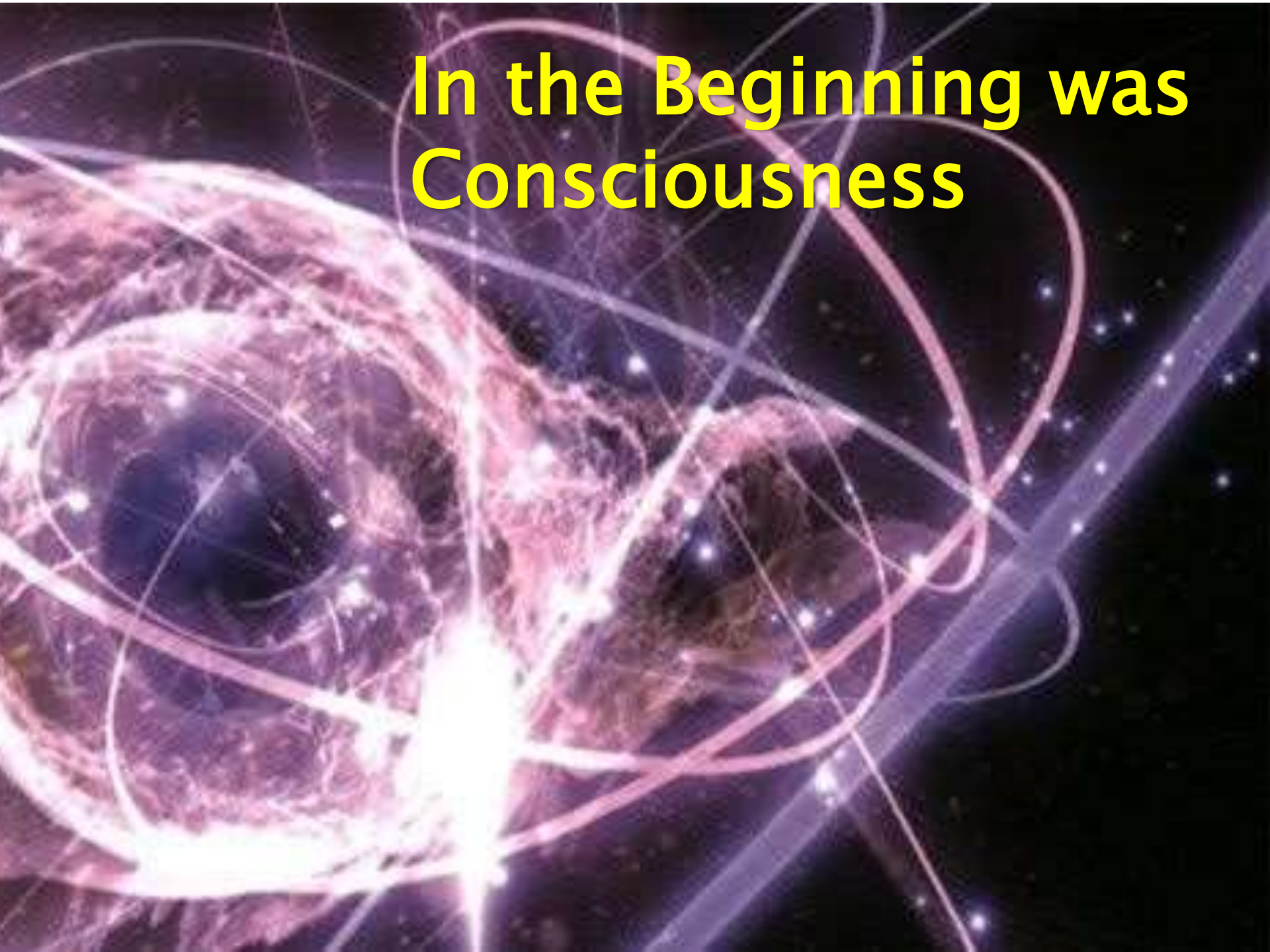
Bertrand Russell



I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness. Everything that we talk about, everything that we regard as existing, postulates consciousness.

(Max Planck)

In the Beginning was Consciousness

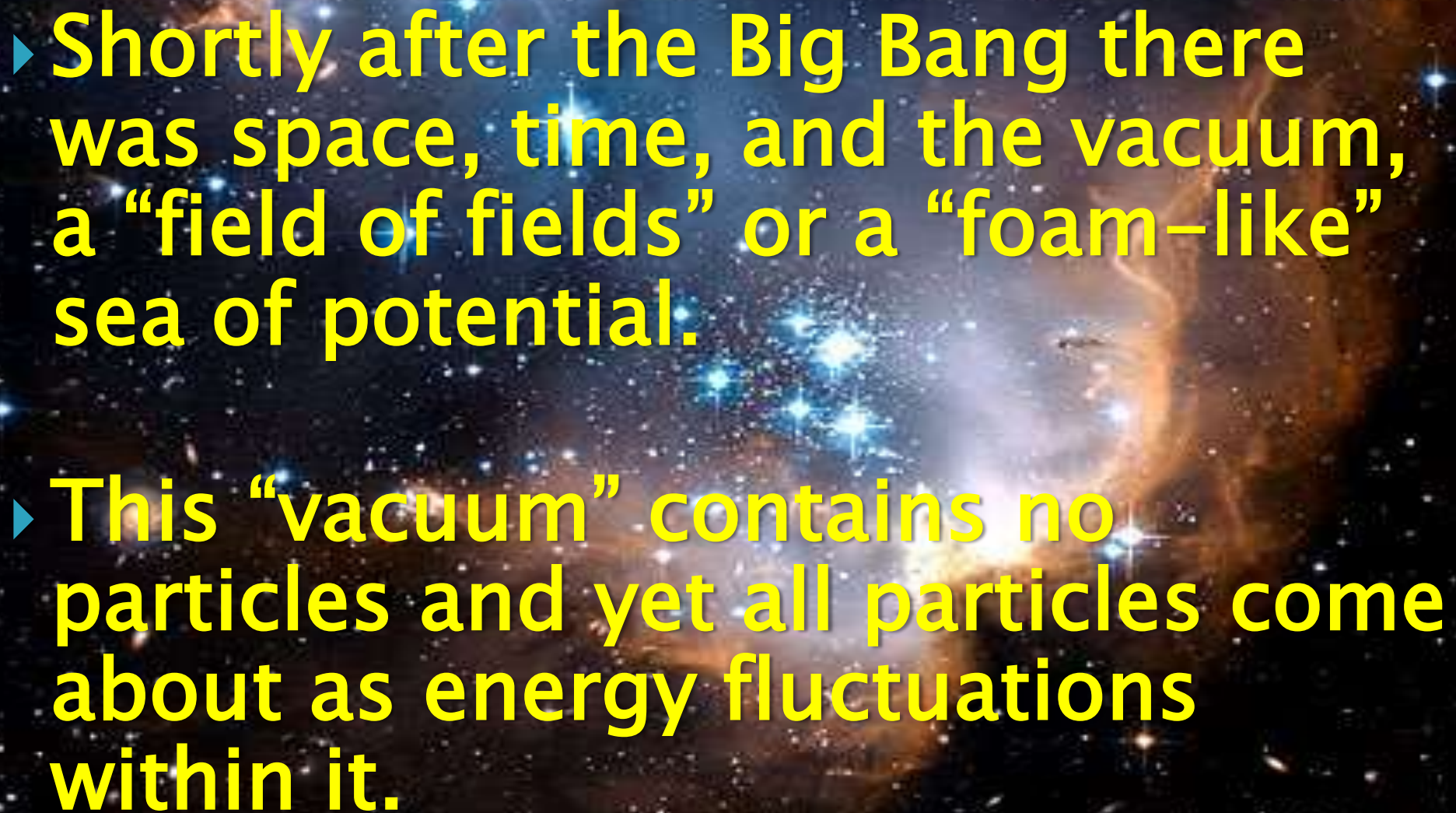




Consciousness cannot be accounted for in physical terms. For consciousness is absolutely fundamental. It cannot be accounted for in terms of anything else.

— *Erwin Schrödinger* —

AZ QUOTES

- 
- ▶ Shortly after the Big Bang there was space, time, and the vacuum, a “field of fields” or a “foam-like” sea of potential.
 - ▶ This “vacuum” contains no particles and yet all particles come about as energy fluctuations within it.

What is Consciousness?

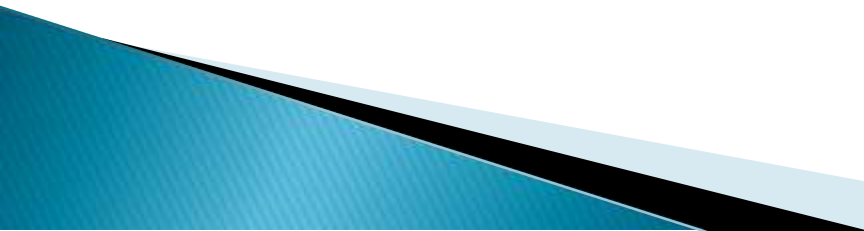
**“Consciousness is the “wave side”
of the wave–particle duality.”**


Niels Bohr

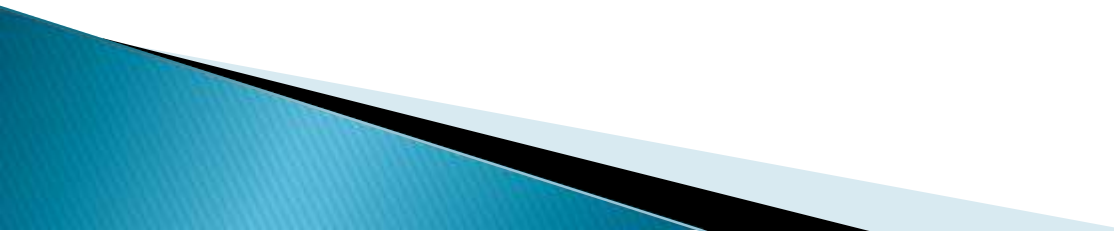
**Consciousness is a system
of feedback loops, a type of relationality
that includes communication
and the flow of information.**


Michio Kaku

Alfred N. Whitehead

- ▶ Whitehead was the first philosopher to recognize the radical implications of quantum physics. He saw that the wave theory of matter destroyed the old idea of material bodies as essentially spatial, existing at points in time, but with no time within them.
 - ▶ According to quantum physics, every primordial element of matter is 'an organized system of vibratory streaming of energy'
- 

- ▶ A wave does not exist in an instant — it takes time; its waves connect the past and the future. Whitehead thought of the physical world as made up not of material objects but events.
 - ▶ An event is a happening or a becoming. It has time within it. All physical objects are processes.
 - ▶ Space itself is composed of events, of actual entities and their relationships.
 - ▶ Space is not empty vessel in which things happen. Space itself is a web of events and relationships.
- 

- ▶ Connection between mind and body is a relationship in time. For Whitehead, mind and matter are related as phases in a process. Time, not space, is the key to their relationship.
 - ▶ Reality consists of processes, and one moment informs the next. The distinction between moments requires the experiencer to feel the difference between the moment of now and past or future. Whitehead summed this up in the phrase, 'Now subject, then object.'
 - ▶ Experience is always 'now', and matter is always 'ago'.
- 

- ▶ Feelings and experiences are more fundamental than human consciousness, and mental events are informed and conditioned by material events.
 - ▶ Knowing can happen only because the past streams into the present, forming it and shaping it, and at the same time the subject chooses among the possibilities that help determine its future.
 - ▶ Developed a philosophy of organism
- 

*Every level of interior
consciousness is accompanied
by a level of exterior physical
complexity.*

Ken Wilbur

**Consciousness
Increases with complexity**



**Mind may be the realm
where synthesizing activity occurs.**

Panpsychism or Dual-Aspect Monism?

- ▶ **Panpsychism** = mind and matter are inseparable; experience. (cf. Philip Goff's book *Galileo's Error*)
- ▶ **Dual-aspect monism** – mind and matter are two basic aspects of an underlying domain apprehended indirectly. (ex. Teilhard named “love” as core energy of universe)

Panpsychism

- ▶ **Consciousness is a fundamental quality of the cosmos, as fundamental as space, time and matter, or even more so, undergirding these properties.**
- ▶ **Consciousness, in a sense, precedes or grounds material forms; everything has consciousness; the mental occurs down to the lowest level of the physical world.**



Information Integration Theory

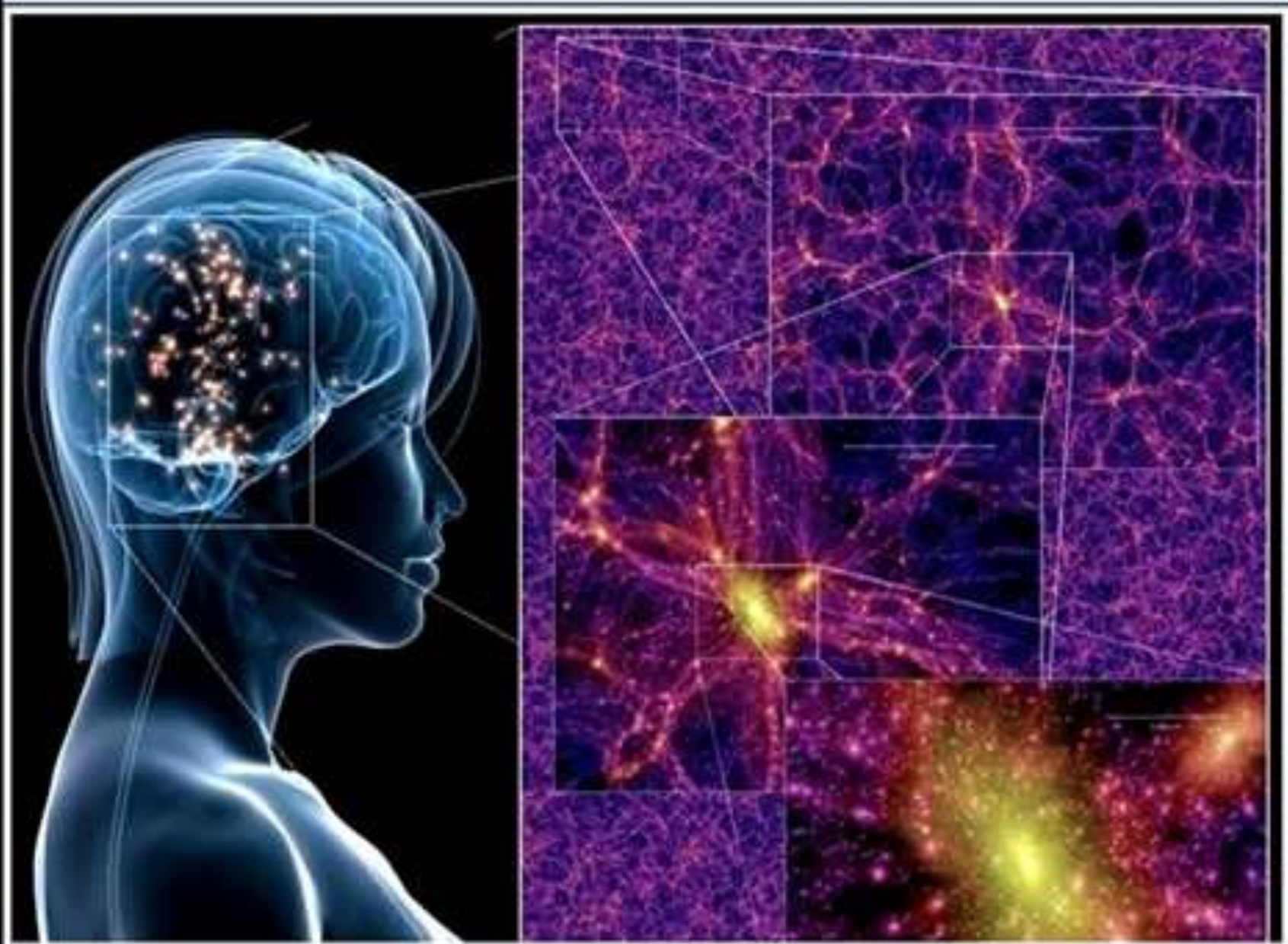
Tononi & Edelman (2008);
Tononi (2012); Oizumi et al. (2014)

- **Consciousness is a Property of Integrated Information**
 - Not Located in a System's Parts
- **Φ as a Measure of Integrated Information**
 - Consciousness is Correlated with Phi
- **Consciousness Determined by Physical Organization of a System**
- **NCC = Any Brain Region with Large Φ**
 - Also Any Other Physical System with Large Φ

Electromagnetic Field Theories of Consciousness



The Universe as a Part of a Larger Mind



*“Mind no longer appears as an
accident intruder into the
realm of matter.....
Mind may be the creator and
governor
of the realm of matter. . . .
the background of the universe is
mindlike.”*

James Jean (1950)



**What accounts for
the human mind
is active in the universe.**

Teilhard's Two Energies

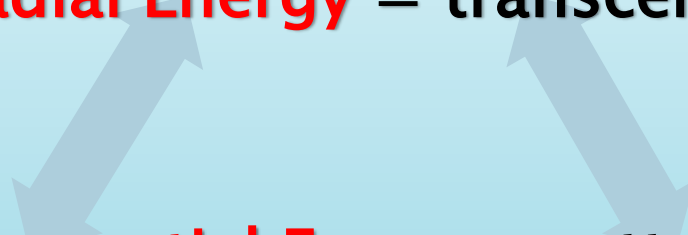
Consciousness
Withinness

Radial Energy = transcendence

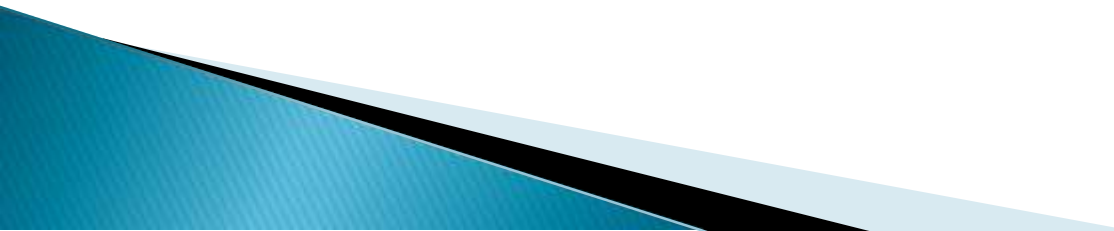
Tangential Energy = attraction

Attraction
Withoutness

Attraction
Withoutness



Teilhard de Chardin

- ▶ **Matter is the matrix of spirit. Spirit is the higher realm of matter.**
 - ▶ **All matter is some form of spirit; all spirit is some form of matter.**
- 

Love as a Cosmological Force

Physical reality:

Attraction
Union
Emergence

“The force of love–energy is present from the Big Bang onwards, though indistinguishable from molecular forces.”

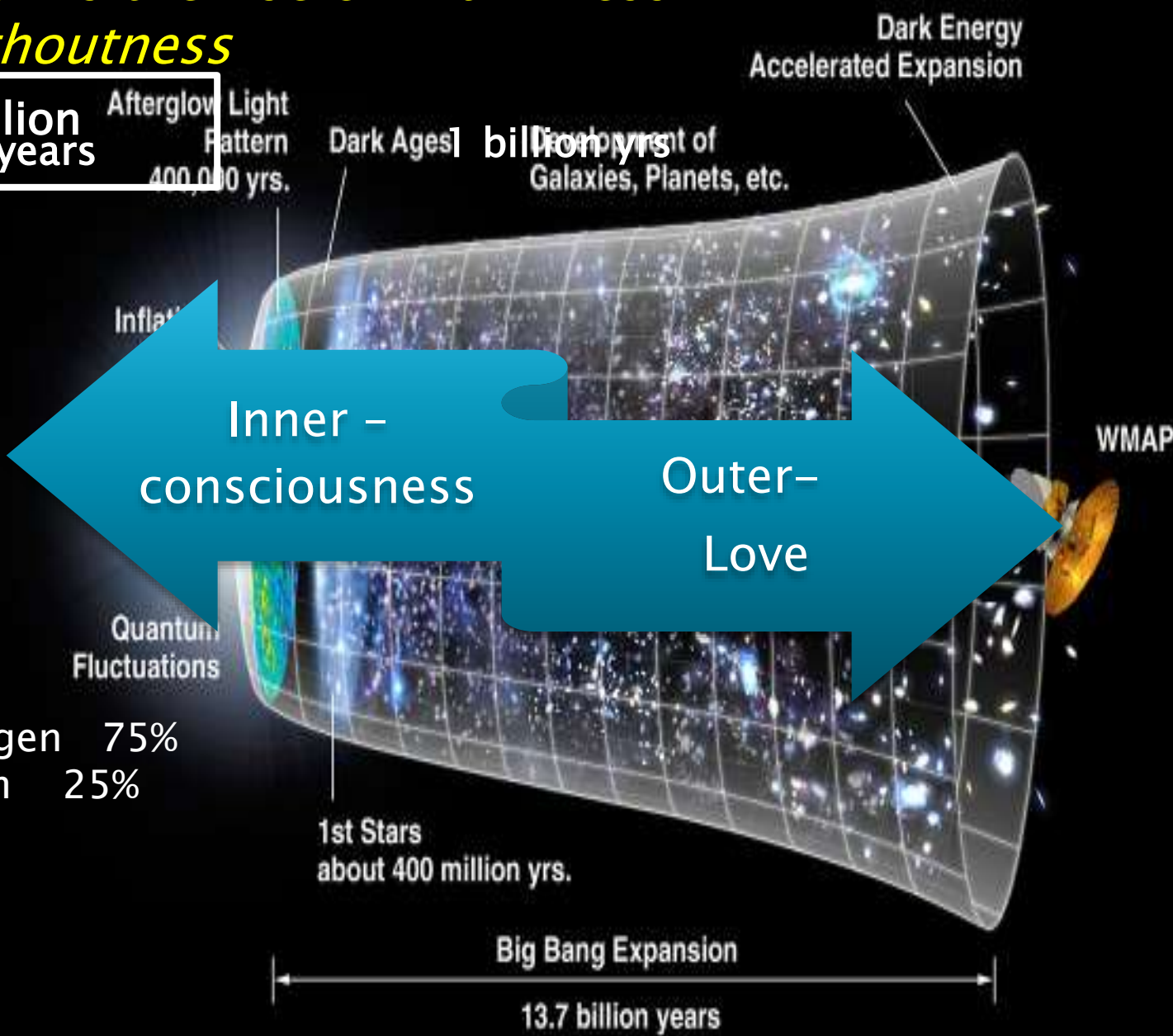
TOWARD MORE CONSCIOUSNESS

*“The physical structure
of the universe
is love.”*

*Teilhard de Chardin
Human Energy*

Evolution is the rise of withinness and withoutness

13.8 billion years



Hydrogen 75%
Helium 25%

Biological Evolution

Static
Dynamic



Fixed



Changing

Mechanism



Process

*Lawful nature at play in
the spontaneity of life*

Human Evolution

THE STUDY OF SCIENCE

Human Evolution



Edited by Rusty Huddle

Britannica
Educational Publishing

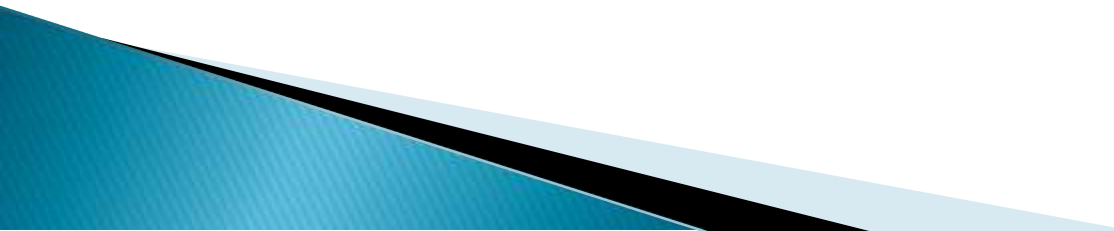


“Evolution of life now appears no longer as a process of the adaptation of species to their environment, but as the adaptation of minds to increasingly complex forms that exist in the cosmic potentiality.”

Lothar Schaefer



Human evolution

- ▶ **We are unfinished**
 - ▶ **We are being created and are creating**
 - ▶ **Life emerges toward newness/future**
 - ▶ **An irreversibility of time**
 - ▶ **Life evolves by creative power**
- 

Creativity

Novelty

Future

Evolution and Emergence

“Emergence means that the world exhibits a recurrent pattern of novelty and irreducibility.”

P. Clayton, *Mind and Emergence*, 39.

Systems Thinking

- ▶ 1920s – biologists viewed living organisms as integrated wholes
- ▶ systems -- whole greater than sum of parts
- ▶ System – an integrated whole whose essential properties arise from the relationship between its parts. The understanding of a phenomenon within the context of a larger whole.



Systems

Closed systems:

- self-contained, self-maintained
- little exchange with environment
- proceeds in direction of increasing disorder
- little complexity

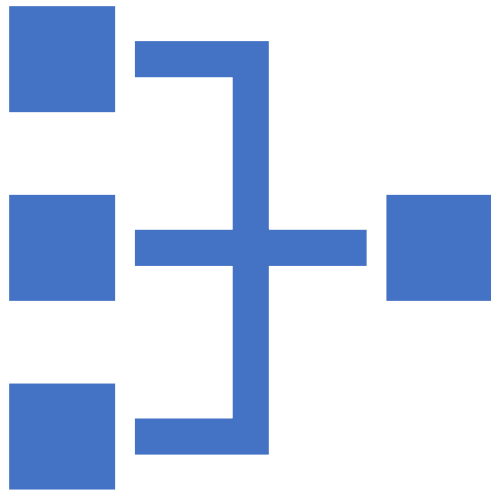
Open systems:

- far from equilibrium
- open to environment
- spontaneous new order
- complexity

Systems' Thinking



- ▶ Arise from interactions and relationships among parts.
- ▶ Properties of parts can be understood only from organization of whole.
- ▶ Concentrates not on building blocks but on principles of organization.
- ▶ Thinking is "contextual" not analytic.



- ▶ **Integrated wholes whose properties cannot be reduced to parts.**
- ▶ **A part is a pattern in an inseparable web of relationships. Thus shift from parts to whole is also a shift from objects to relationships.**
- ▶ **Properties are destroyed when system is dissected into isolated elements.**
- ▶ **Properties of parts are not intrinsic properties but understood only within context of the larger whole.**

Systems Thinking

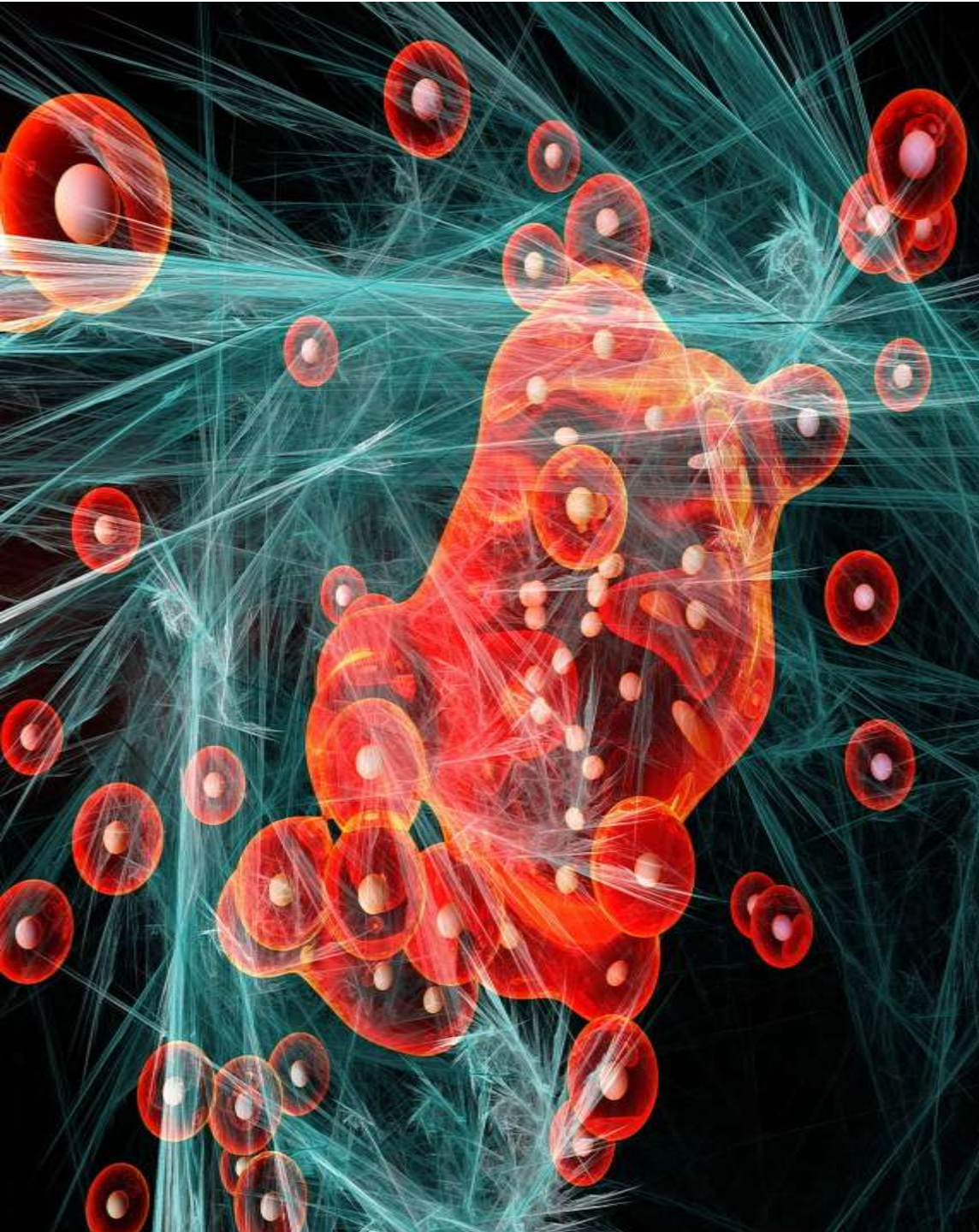
Connectedness

Relationship

Context

Shift from objects to relationships

Material universe seen as dynamic web of interrelated events



HOLONS

A *holon* is a whole that is part of other wholes.

For example, a whole atom is part of a whole molecule; a whole molecule of part of a whole cell; a whole cell is part of a whole organism. . . Reality is composed of neither wholes nor parts, but of whole/parts, or holons.



Self-Organization in Biological Systems

Scott Camazine Jean-Louis Deneubourg Nigel R. Franks
James Sneyd Guy Theraulaz Eric Bonabeau



PRINCETON STUDIES IN COMPLEXITY

- ▶ New concepts in **physics, biology and chemistry** have brought about a profound change in worldview; **from mechanistic worldview to a holistic ecological view.**
- ▶ Holistic = world is an integrated whole rather than parts.
- ▶ Sees the world not as a collection of isolated objects but as a network of phenomena that are fundamentally interconnected and interdependent. Recognizes intrinsic value of all living beings and views humans as one particular strand in the web of life.

HOW TREES COMMUNICATE
AND CARE FOR EACH OTHER –
A SCIENTIFIC JOURNEY INTO THE
"WOOD WIDE WEB"



INTELLIGENT TREES

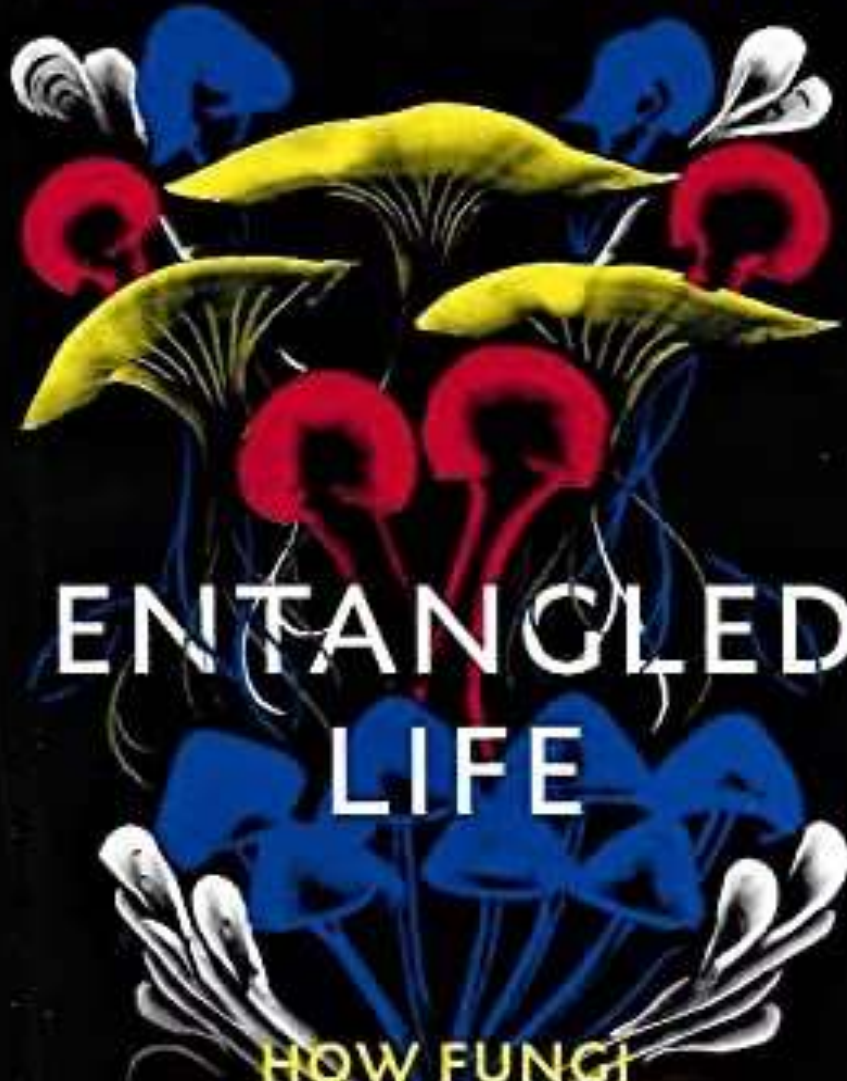
DORCON FILM presents "INTELLIGENT TREES"
A film by JULIA DORNEL and GÜNDO TÖLKE

Featuring forester and bestselling author
PETER WOHLLEBEN ("The Hidden Life of Trees")
and forest ecologist SUZANNE SIMARD



THE UNIVERSITY
OF PATRICK COLUMBIA

MERLIN SHELDRAKE



ENTANGLED LIFE

HOW FUNGI

MAKE OUR WORLDS, CHANGE OUR MINDS,
AND SHAPE OUR FUTURES

Morphogenetic fields can be used to describe how the human consciousness is shared.

As more and more people learn or do something it becomes easier for others to learn or do it.



The turn to matter

- ‘New materialist’ ontology:
 - Not entities but relations.
 - Not agency but affects (the capacity to affect or be affected).
 - Not structures but un/stable assemblages.
 - Not construction but production.
 - Not textualities but matter.

@socnewmat

Implicate Order



Posthuman: Deep relationality

Humans

Non-
humans

Vital life
force

Rhizomic subjectivity



- ▶ An extra-personal and a trans-personal capacity, which should be driven away from any universalism and grounded instead in the radical immanence of a sense of belonging to and being accountable for a community, a people and a territory.

*“Religion and science are
the two conjugated faces
or phases
of the same complete act
of knowing”*

Teilhard de Chardin

Religion and Science: Seeing the Whole

