

# How to Heal Planet Earth, seen as a Complex System

Piet Hut

Institute for Advanced Study, Princeton

The Past and Future of Simulation Astronomy  
-- Hardware Application Science --  
Center for Planetary Science, Kobe, 5 September 2023

# The 1 REALLY BIG question :

How to address the CRISIS of  
the Biosphere & Civilization



The two most Complex Systems  
that we know of in the Universe

which are fully intertwined as

One Complex System

Dec. 2021: w. Eric Smith: How to analyze **Cascading Crises** !

|\*\_|

April 2022: w. Eric & Jun Makino: How to simulate **the Earth**  
as a Complex System ?

-- how to map overlapping crises ?

-- what framework to use to create such maps ?

^\*/^

Oct. 2022: w. Eric, Will Cavendish, Tim Lenton,  
Matthijs Dijkgraaf, Hikaru Furukawa, Sukti Ghosh:

Journal Club, to engage with **domain knowledge** of crises

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April 2023: w.? : Book: Healing Culture in order to Heal the Planet

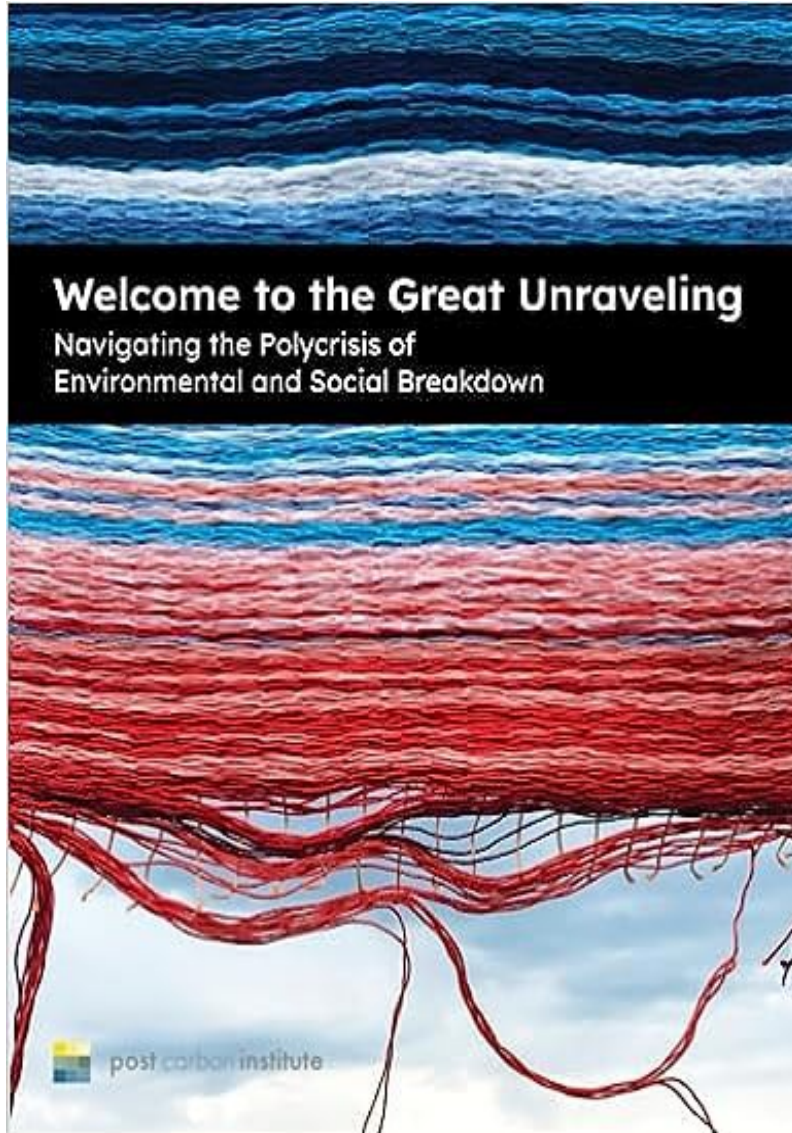
-- how to map a **shared Reality** ?

-- how to model Matter, Mind, and Math ?

-- how to simulate the interplay of Knowledge and Wisdom ?

\_/\*\

Sept. 2023: w. Eric, Jun, Alex Englert et al.: Toward a Culture around  
**a Science of Matter & Mind**, Head & Heart, Facts & Values



We should be spending far less effort building upon expectations of a future that looks much like today only with more technology, mobility, and wealth.

What have we achieved that our distant descendants would like us to preserve for them?

<https://www.resilience.org/stories/2023-06-15/>

[Polycrisis](#)-[unraveling](#)-[simplification](#)-or-[collapse](#)-coming-soon-to-a-planet-near-you/

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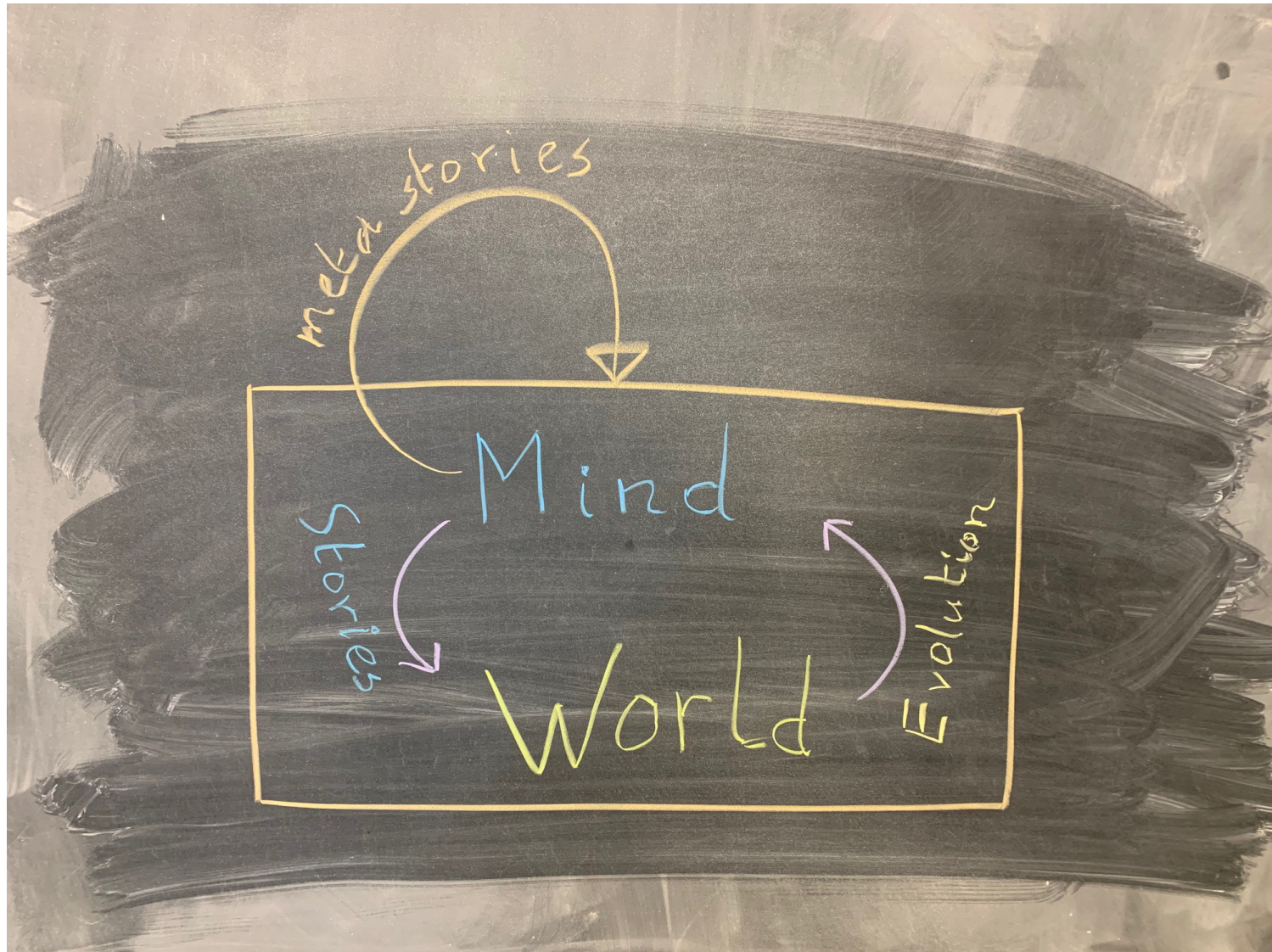
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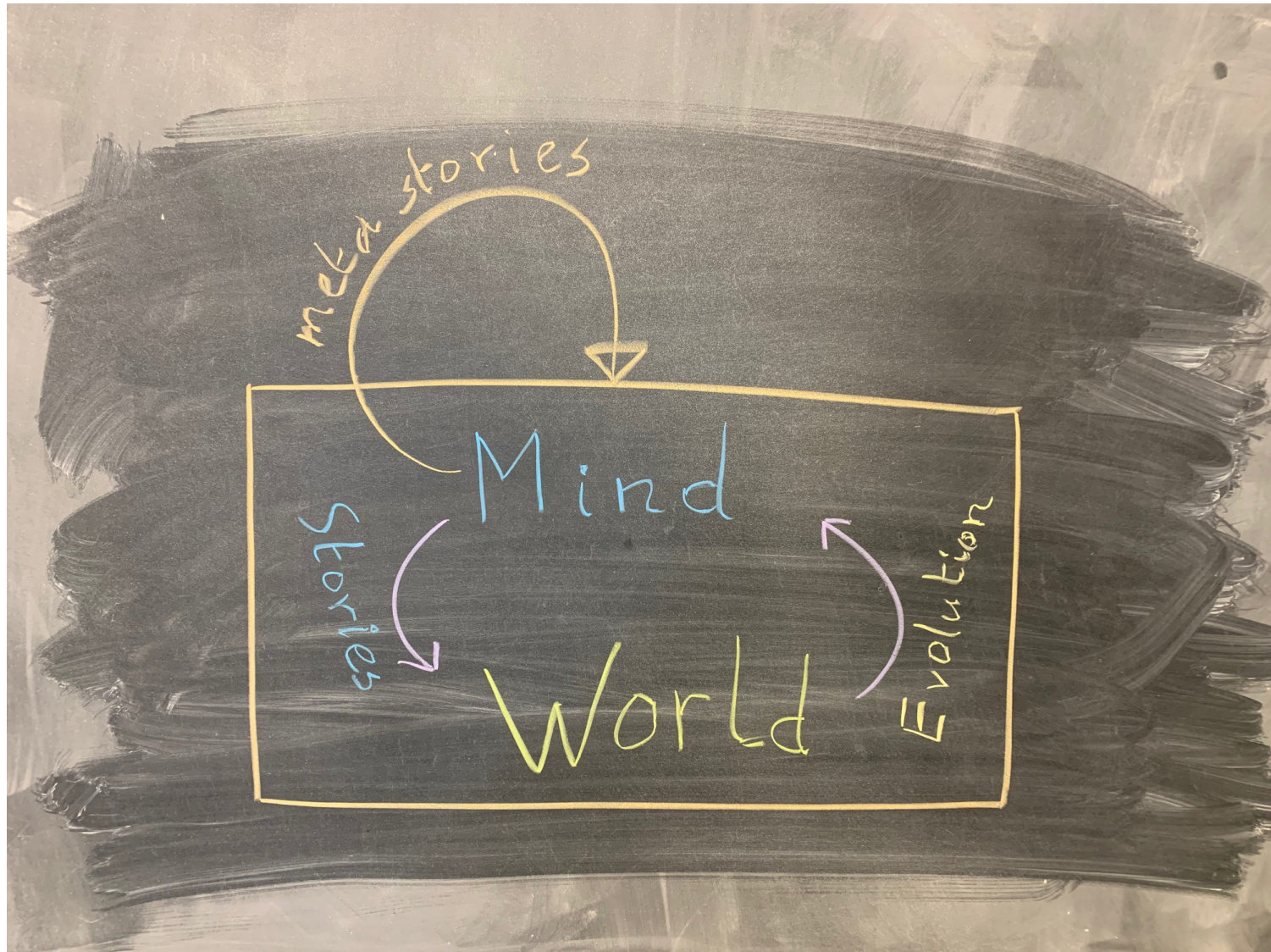
# “The Challenge”



an ongoing project with Eric Smith



Thinking Matter < < < < <



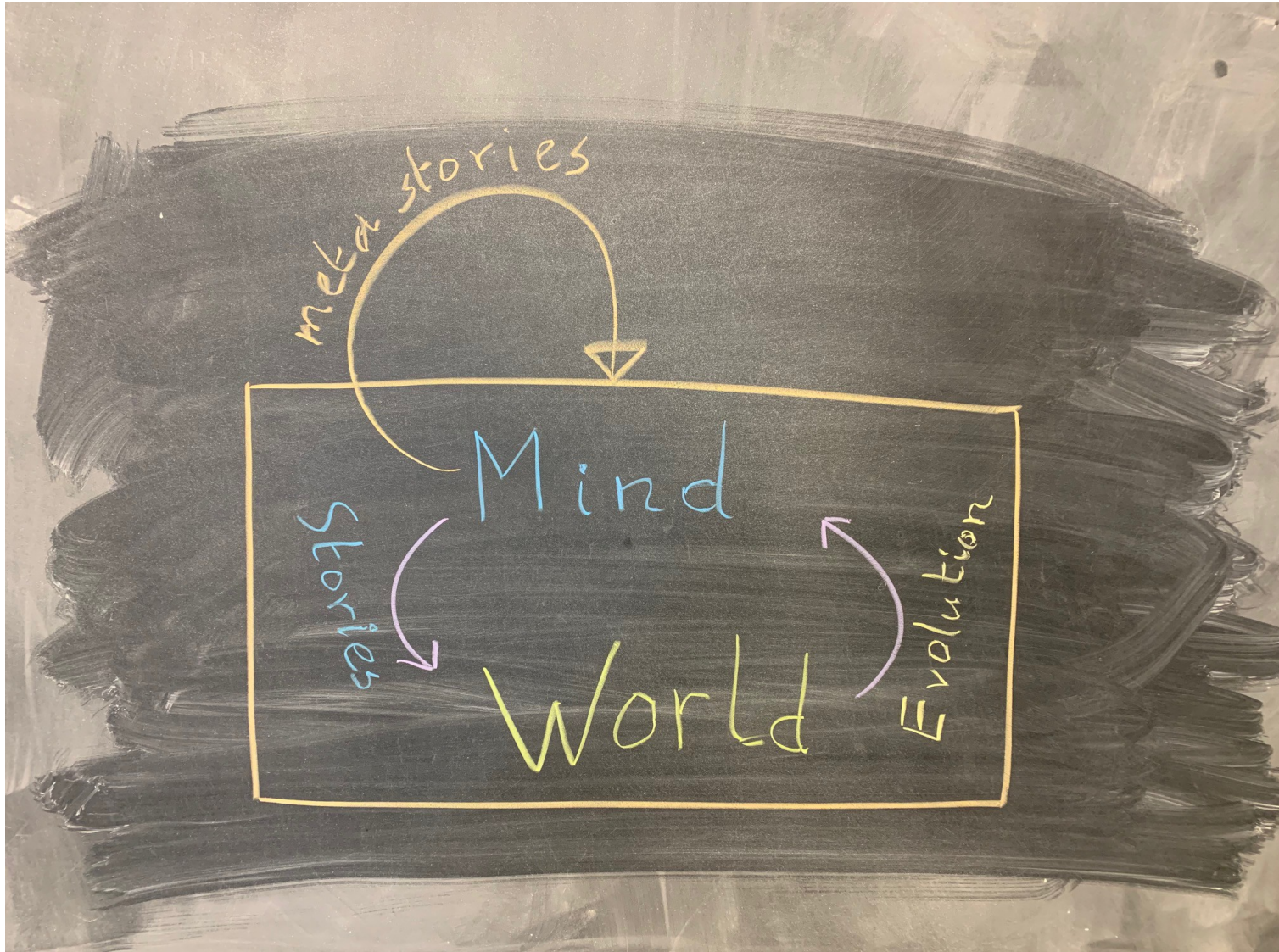
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**Living Matter**  
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Big Bang > Non-Living Matter > > Earth > > >



Thinking Matter

Science



Living Matter

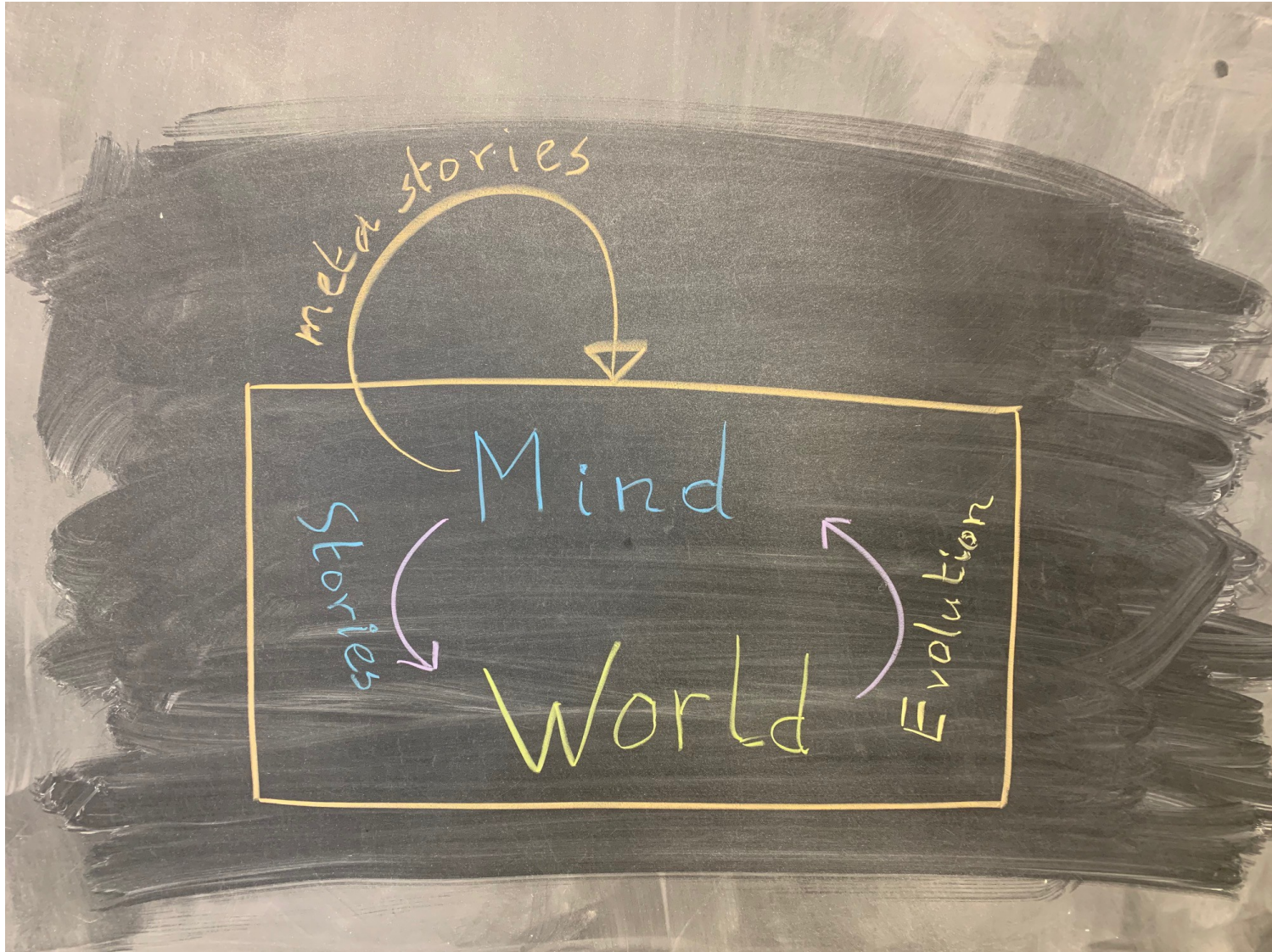
Big Bang > Non-Living Matter > > Earth > > >



Noosphere

Science

Biosphere



Big Bang > Plasma > Lithosphere/Hydrosphere/Atmosphere







# Consciousness Studies: From Stream to Flood

By JAMES GORMAN

**A**T a small restaurant on West 70th Street in Manhattan, Dr. Piet Hut, an astrophysicist at the Institute for Advanced Studies in Princeton, N.J., has pushed aside his French toast to draw a quick sketch of objective and subjective reality. His drawing, on a yellow pad, shows a stick figure, a chair, the stick figure's experience of the chair, the stick figure's experience of itself and the stick figure's understanding of its experience of the chair and itself.

This is not an unusual moment in the current state of the scientific study of consciousness. Everybody from neuroscientists to philosophers to physicists is in the game. And the arena of investigation ranges from high-tech brain imaging centers to breakfast brainstorming, from monkey experiments to thought experiments.

The debate is still open as to whether the problem of consciousness — how felt experience is connected to the physical brain — is purely philosophical, an illusory difficulty that will be swept away by progress in neuroscience, or one that requires a revamping of all of science, starting with physics, which is what Dr. Hut is suggesting.

Whatever the approach, the stream of consciousness studies, rising for more

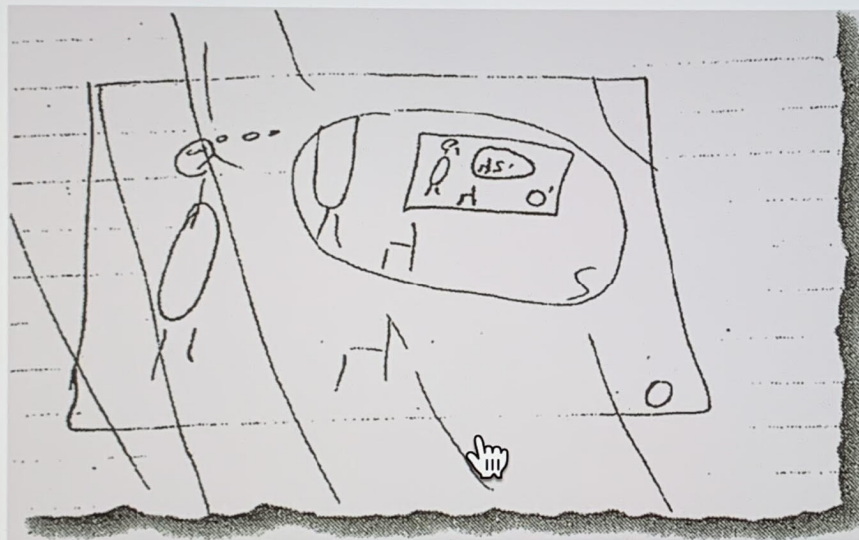
than a decade, seems to be reaching flood stage. Dr. Daniel Dennett, a philosopher and director of the Center for Cognitive Studies at Tufts University, was asked by The Quarterly Review of Biology to review some recent books on the subject. He counted 34 in the last six years, "not including the awful ones, or those by journalists" (or those by Dr. Dennett himself), and decided there

were just too many. He put the project off.

Two scientific journals on consciousness have been started in recent years. A 1995 Massachusetts Institute of Technology Press book, a 1,447-page compilation of articles titled "The Cognitive Neurosciences," is in its fourth printing and has sold 9,000 copies. The book weighs eight pounds and costs \$95. This spring

and summer there are major conferences on consciousness in Montreal and California. "The scientific race for consciousness is on," writes Bernard Baars, a psychologist at the Wright Institute in Berkeley, Calif., in one of those new books, "The Theater of Consciousness" (Oxford University Press). If it is a race,

*Continued on Page C5*



## The West 70th Street Schema

Consciousness has scientists of all kinds scheming. Dr. Piet Hut, a physicist, offers this sketch: the objective world (o), with person and chair; the subjective experience of the world (s), in the balloon; the empirical understanding of the world, including physics (o prime), in the smaller rectangle; and the empirical understanding of subjective experience, including psychology, (s prime), in the small balloon. Dr. Hut argues that when s and s prime are conflated, confusion reigns.



## MUSIC

What becomes a jingle most? More money, writers say. Page C11.



## BOOKS

Pynchon hits the road with Mason and Dixon. Page C11.





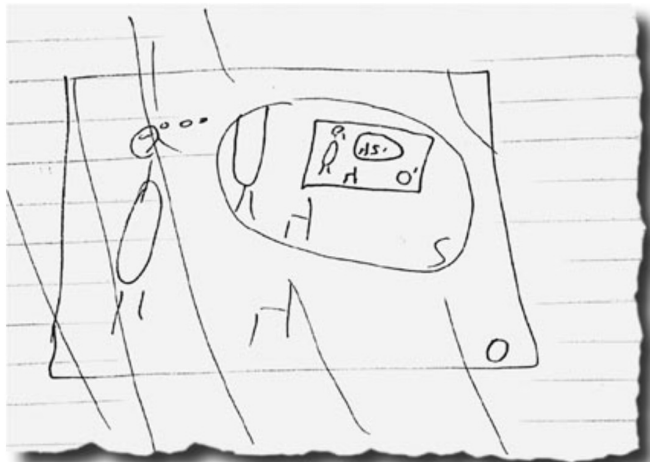
APRIL 29, 1997

## Consciousness Studies: From Stream to Flood

BY JAMES GORMAN

### The West 70th Street Schema

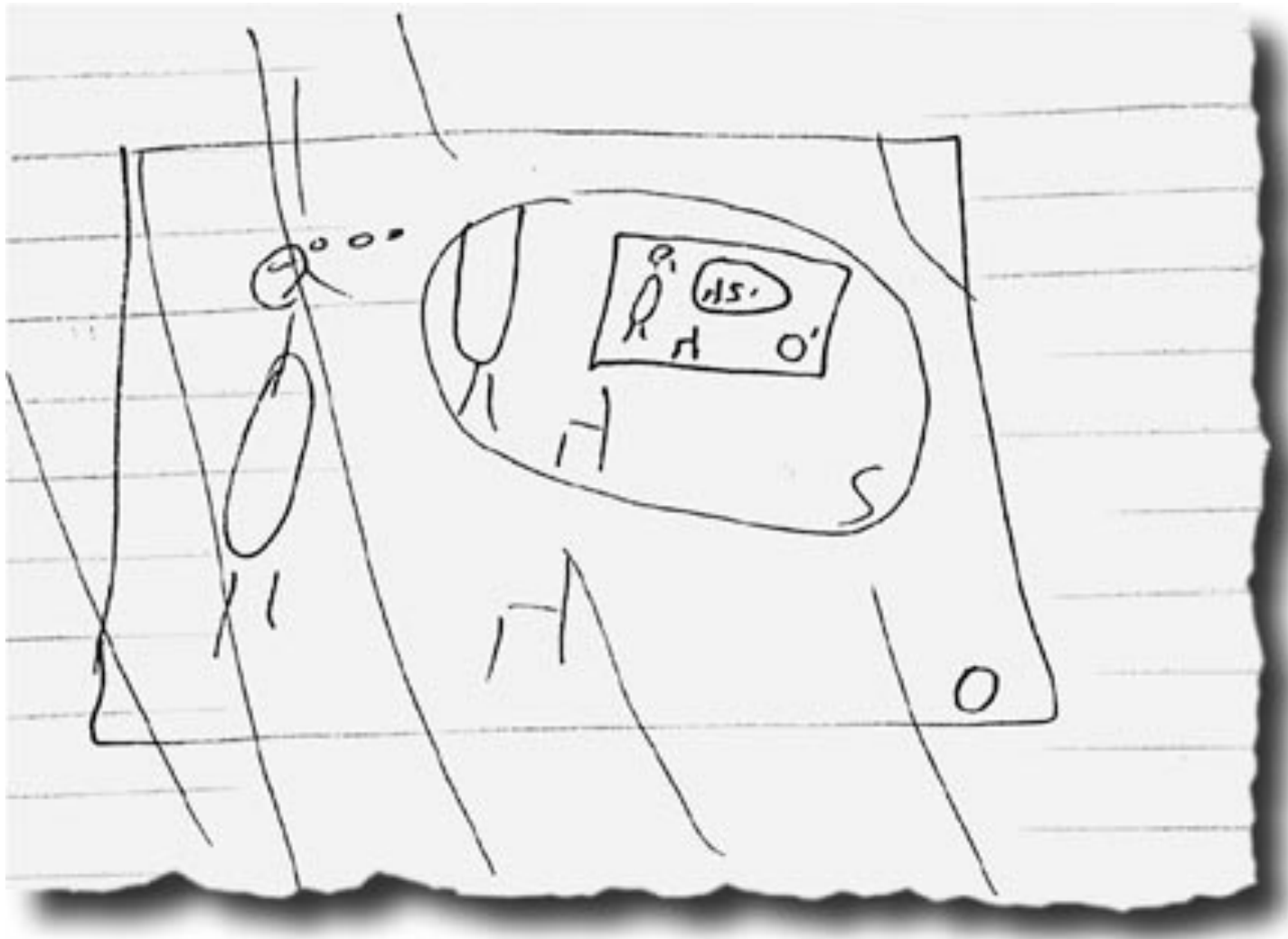
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NEW YORK -- At a small restaurant on West 70th Street in Manhattan, Dr. Piet Hut, an astrophysicist at the Institute for Advanced Studies in Princeton, N.J., has pushed aside his French toast to draw a quick sketch of objective and subjective reality. His drawing, on a yellow pad, shows a stick figure, a chair, the stick figure's experience of the chair, the stick figure's experience of itself and the stick figure's understanding of its experience of the chair and itself.

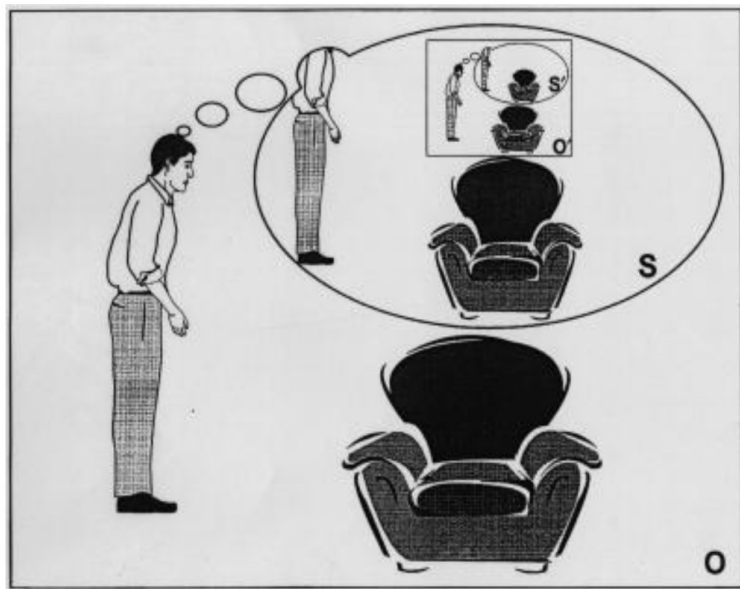
## The West 70th Street Schema

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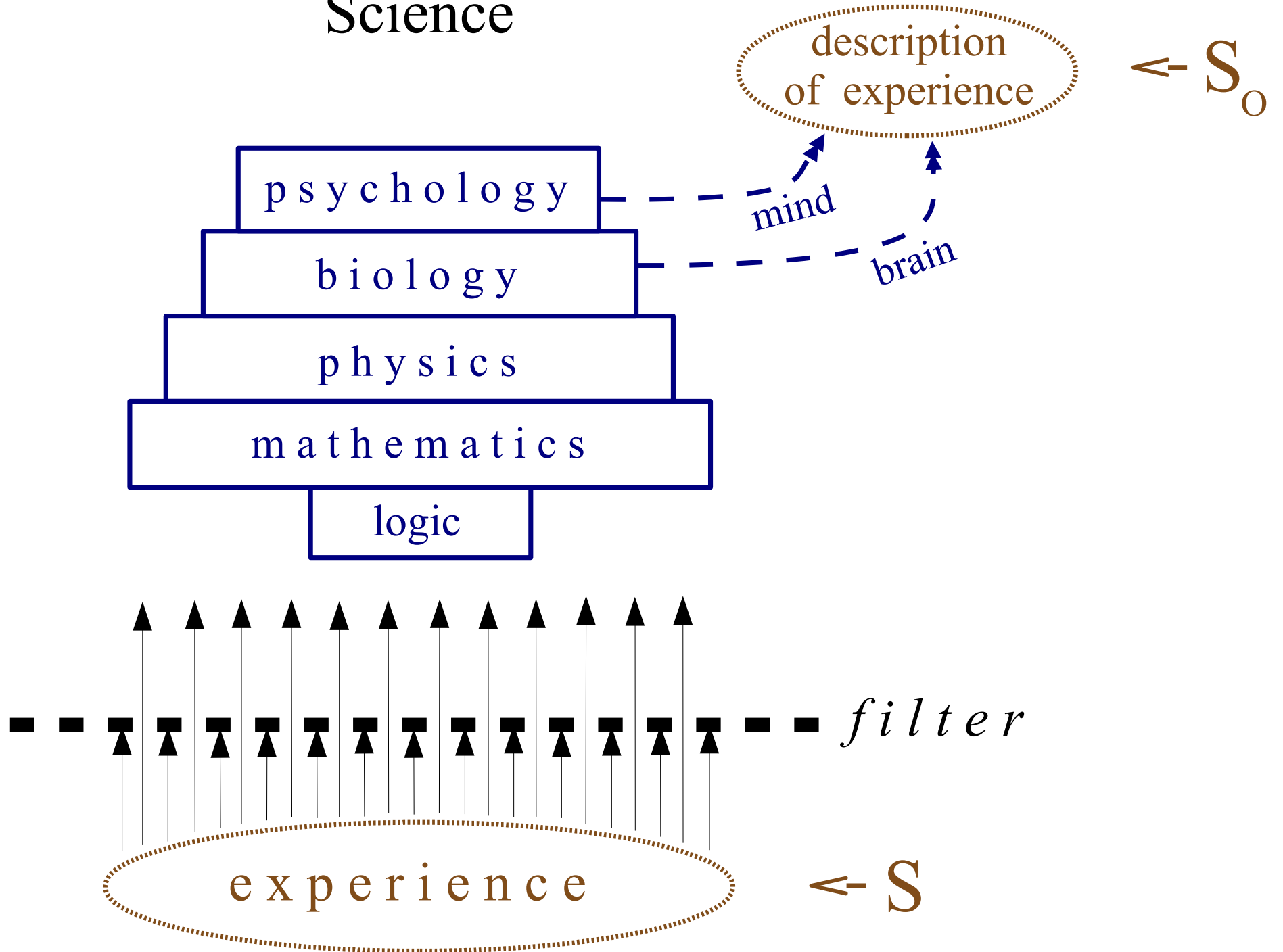
In fig. 1, that subset of  $S$ , corresponding to  $O$ , is indicated by  $O'$ , the realm of experiences of the objective world, as opposed to the objective realm  $O$  itself. The distinction is important: we can be conscious of a chair, but we cannot put a chair as such inside our consciousness. The experience of a chair resides in  $O'$ , while the chair is considered to reside in  $O$ . Finally, the consciousness that we study scientifically can then be called  $S'$ , to distinguish it from the real thing,  $S$ .  $S'$  is the realm of psychology, while  $S$  as such is rarely thematized.  $S$  is the universe of experience, within which all experiences of a person are contained.



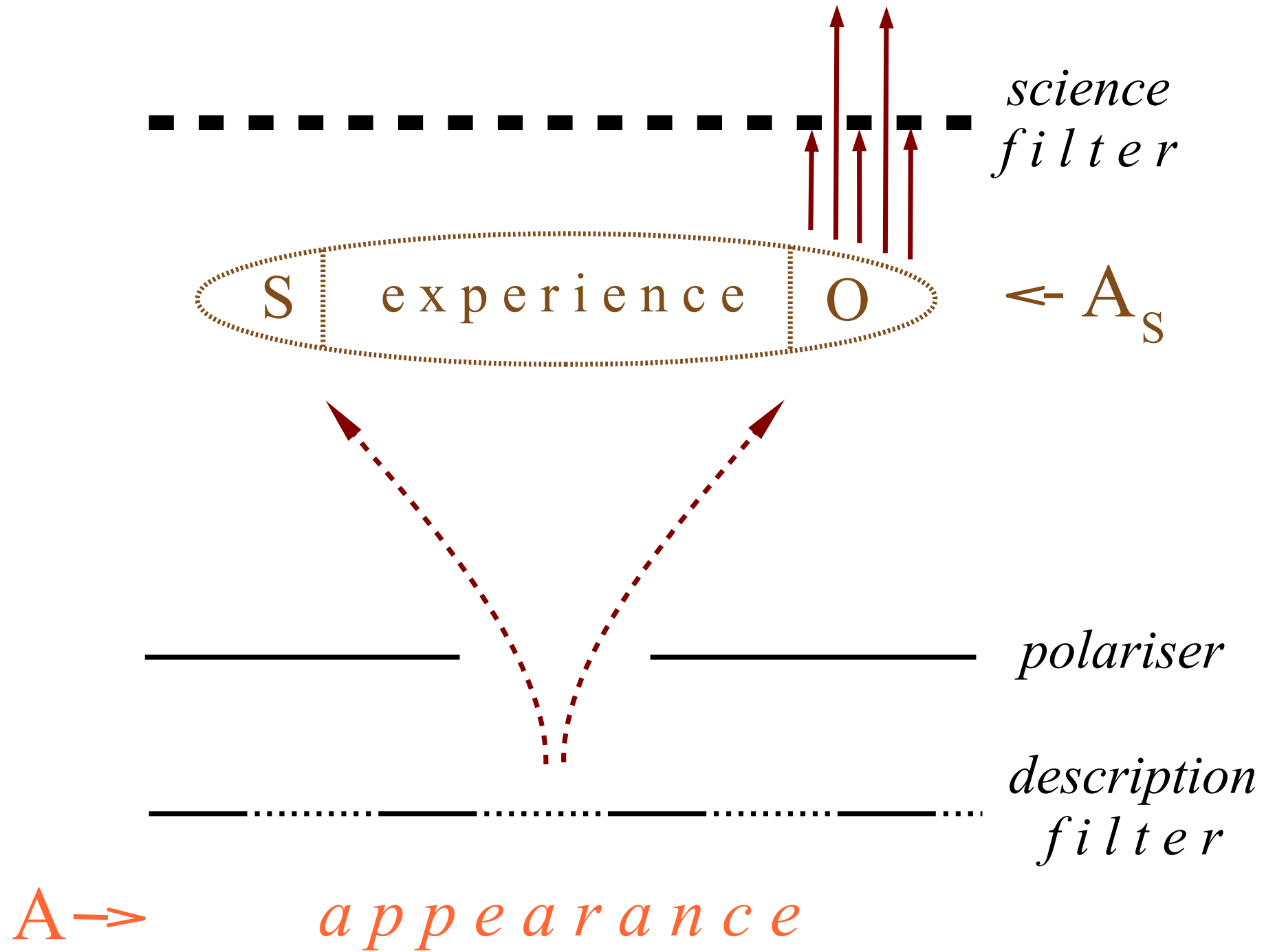
Exploring Actuality through Experiment and Experience,  
Hut, P., 1999, in *Toward a Science of Consciousness III*,  
eds. S.R. Hameroff, A.W. Kaszniak, and D.J. Chalmers  
(Cambridge, MA: M.I.T. Press), pp. 391-405.  
<https://www.ias.edu/ids/~piet/publ/TucsonIII/tucsonIII>

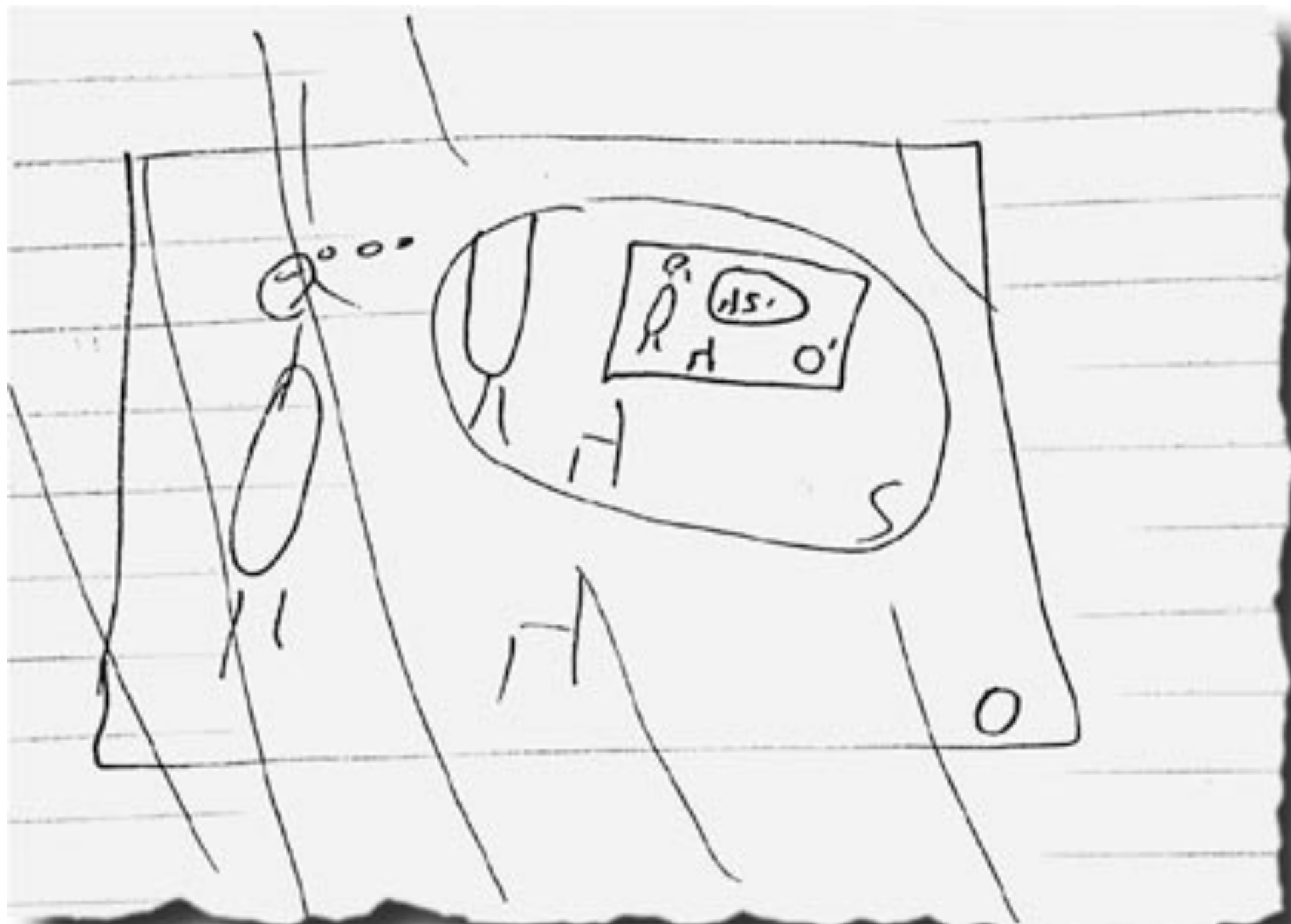
Fig. 1. Objectivity and Subjectivity in a naive interpretation of one person's experience.  $S$  denotes the total realm of experience of that person;  $O'$  that part of  $S$  that is devoted to experiencing the objective world; and  $S'$  that part of  $O'$  that seems to correspond to the experience of that person, viewed as an inhabitant of the world  $O'$ . In contrast, the 'real' objective world,  $O$ , does not and cannot enter directly in the world of experience,  $S$ .

# Science

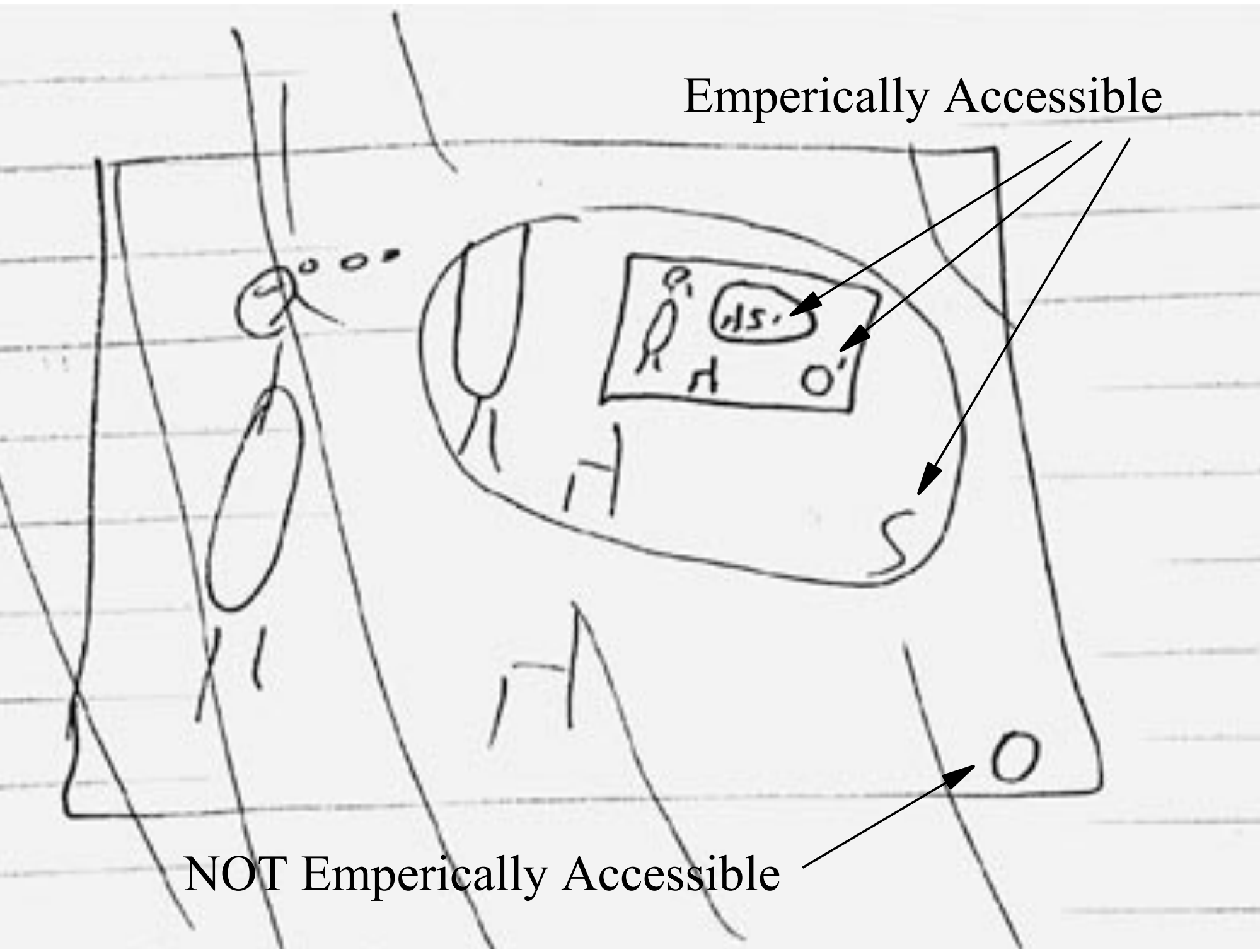






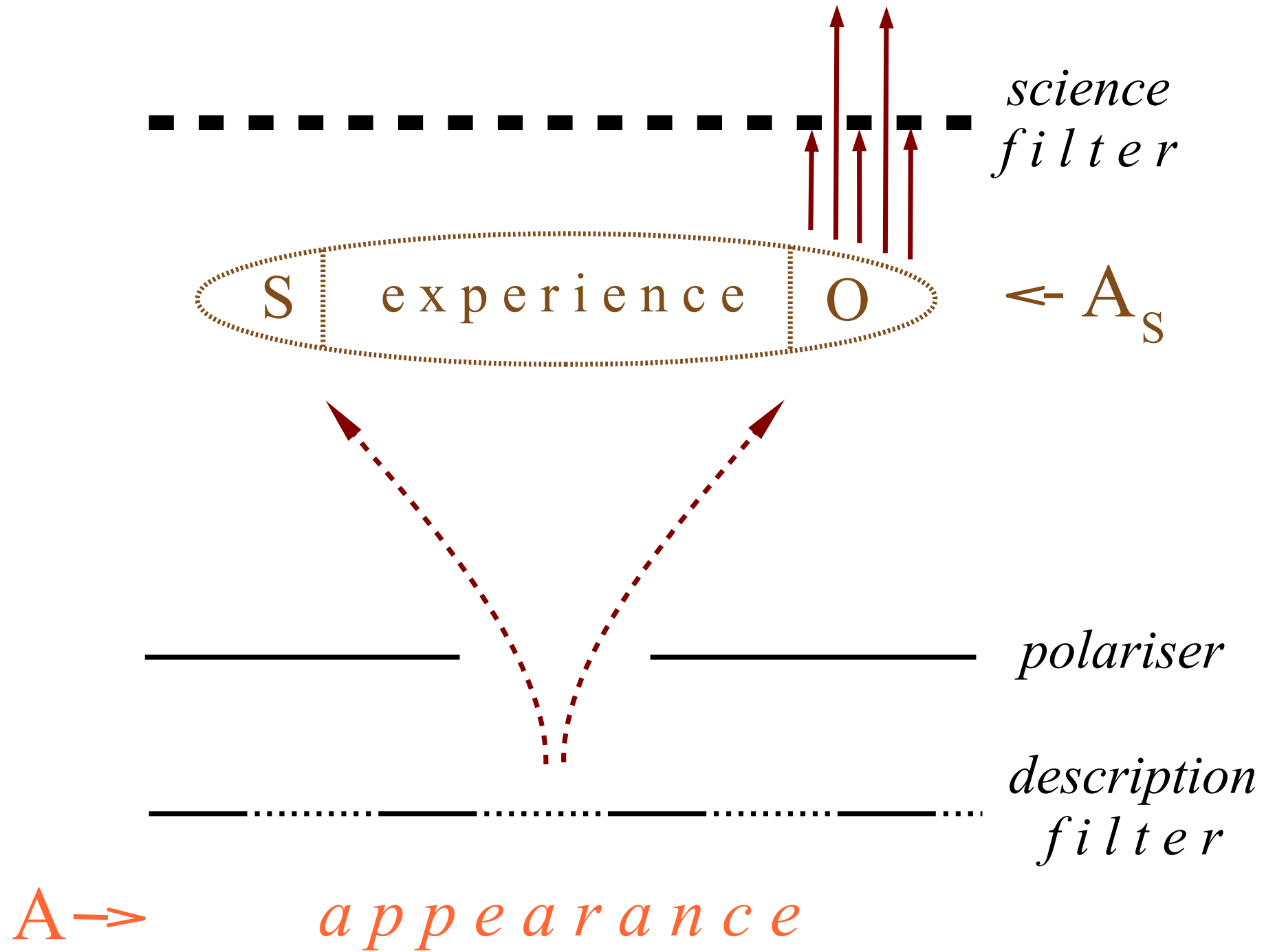


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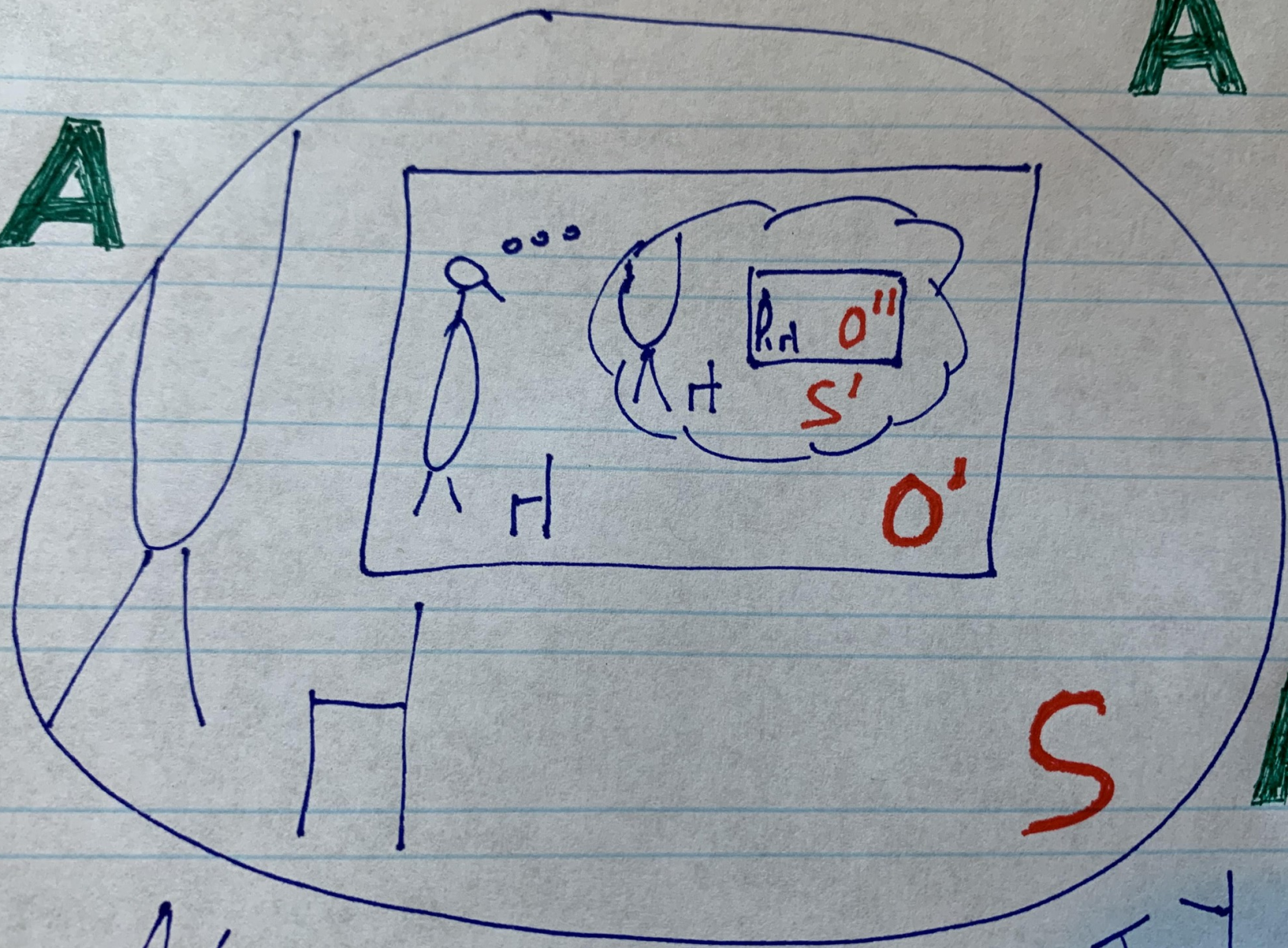
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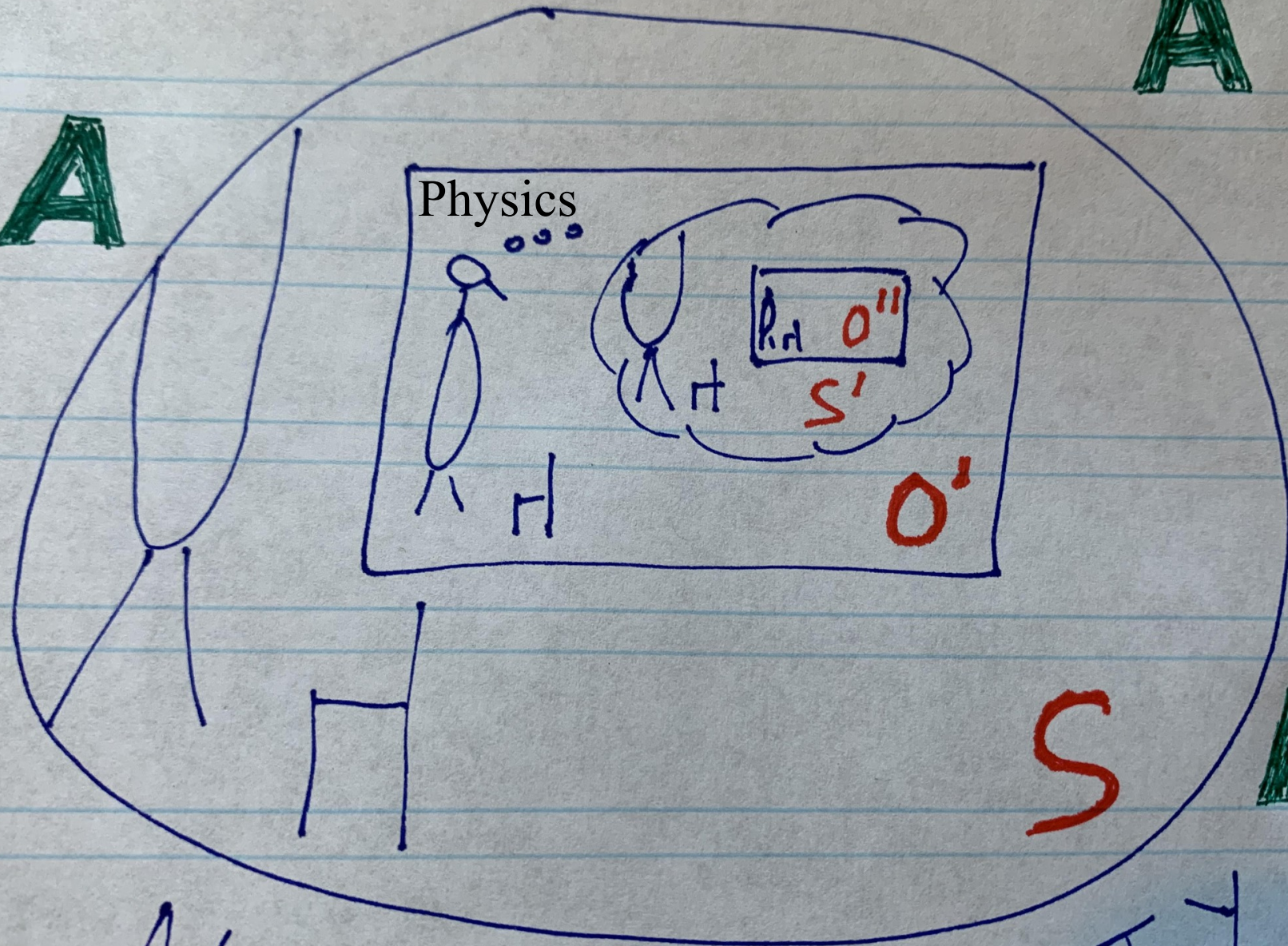
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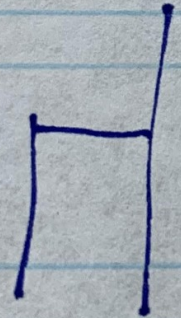
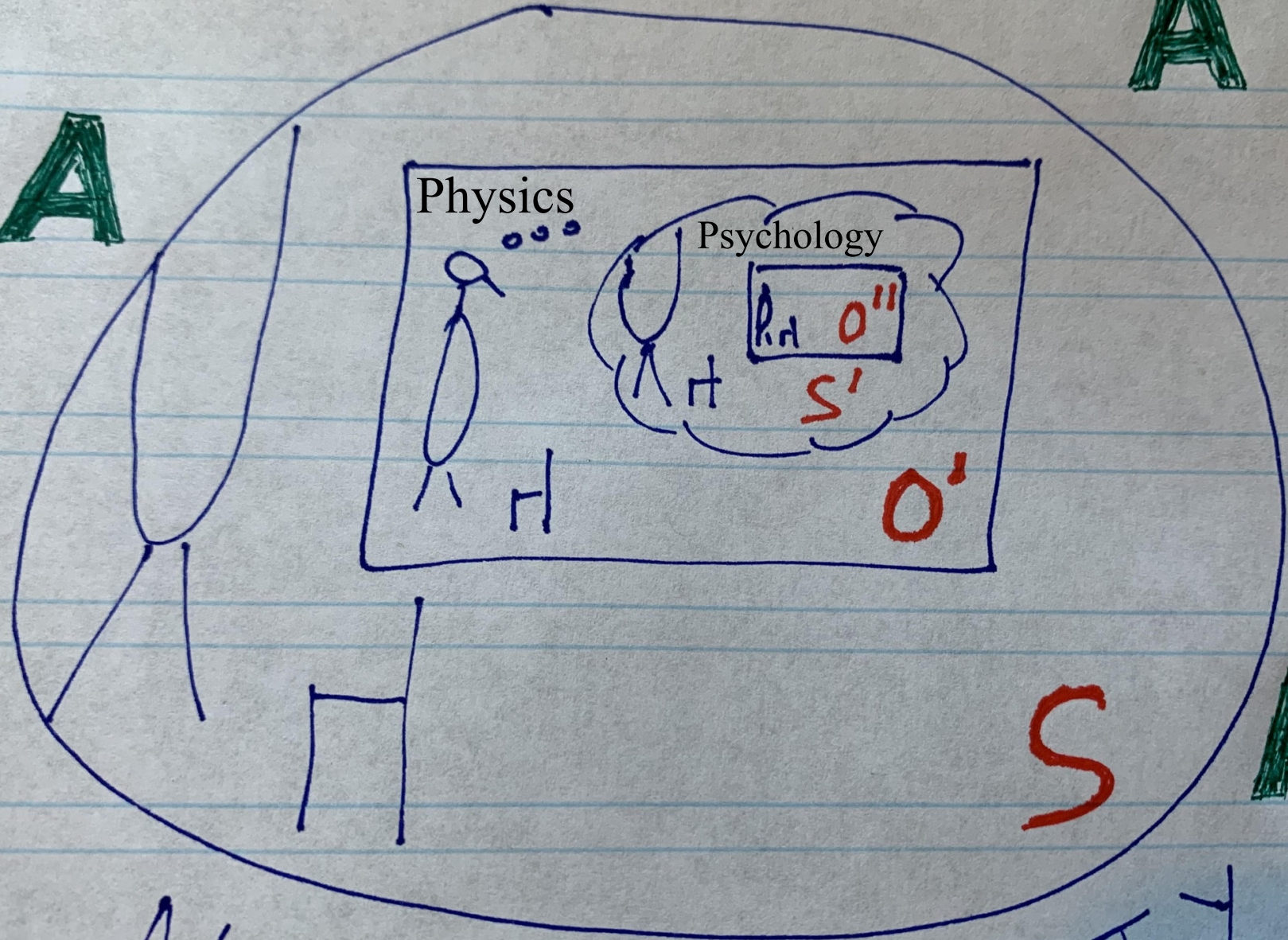
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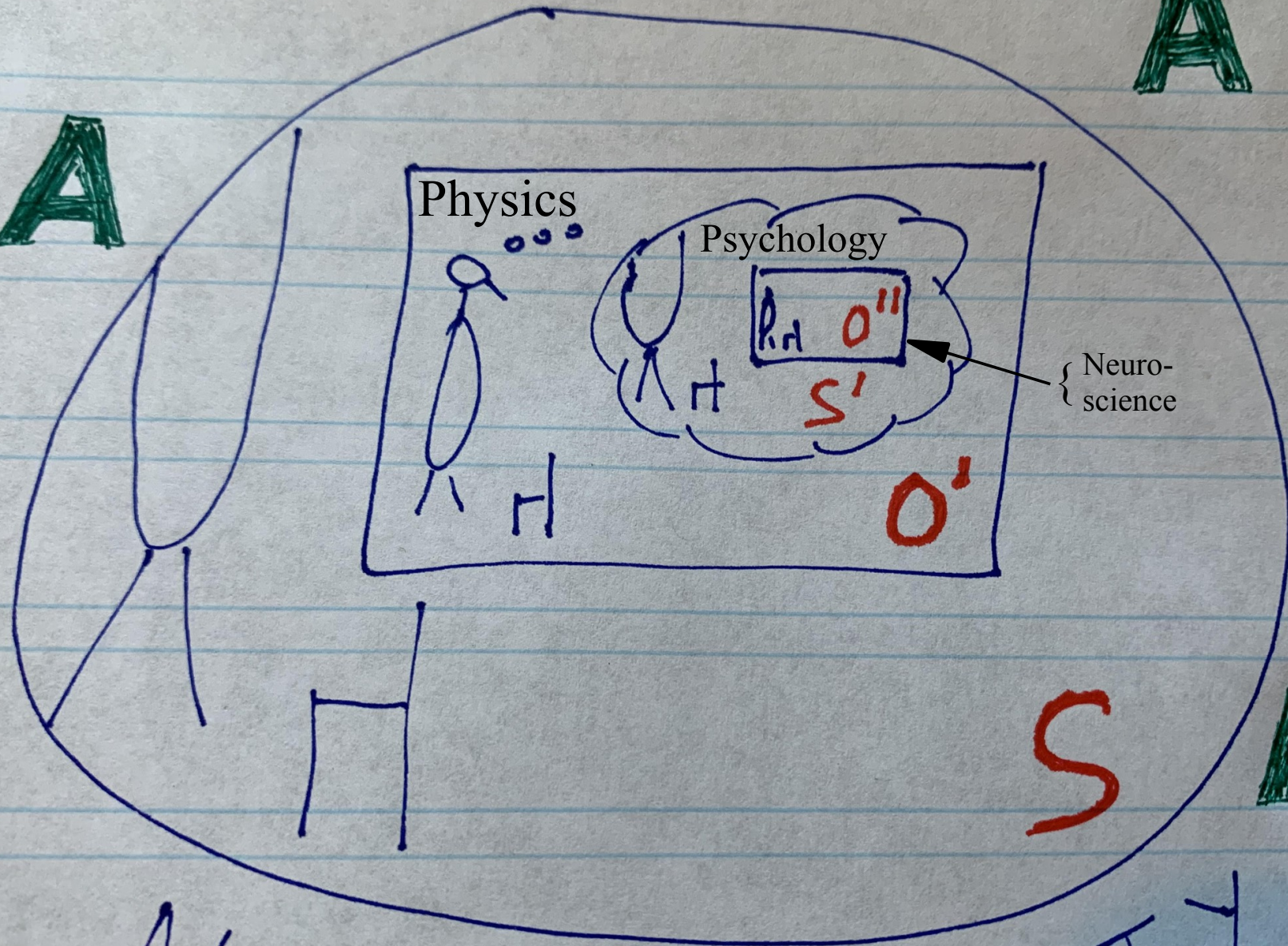
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Physics

Psychology

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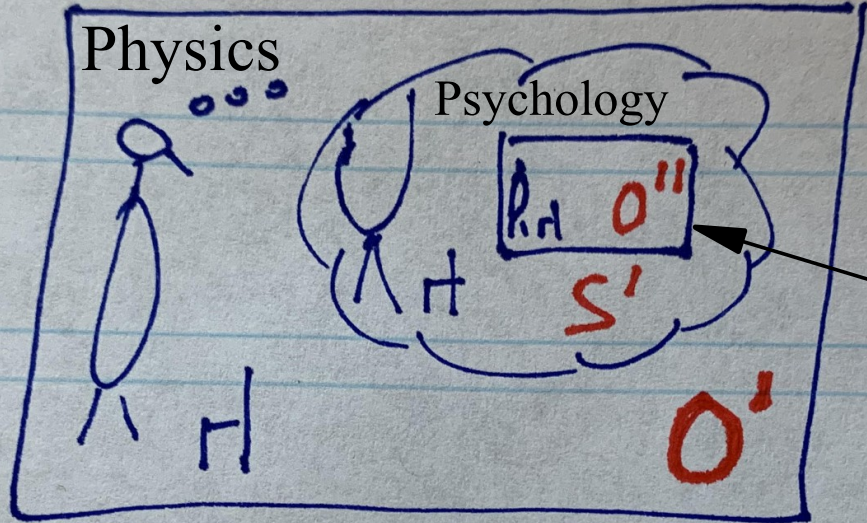
Empirical Philosophy

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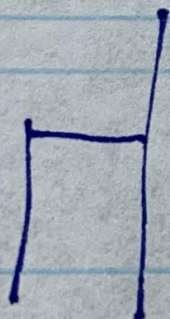
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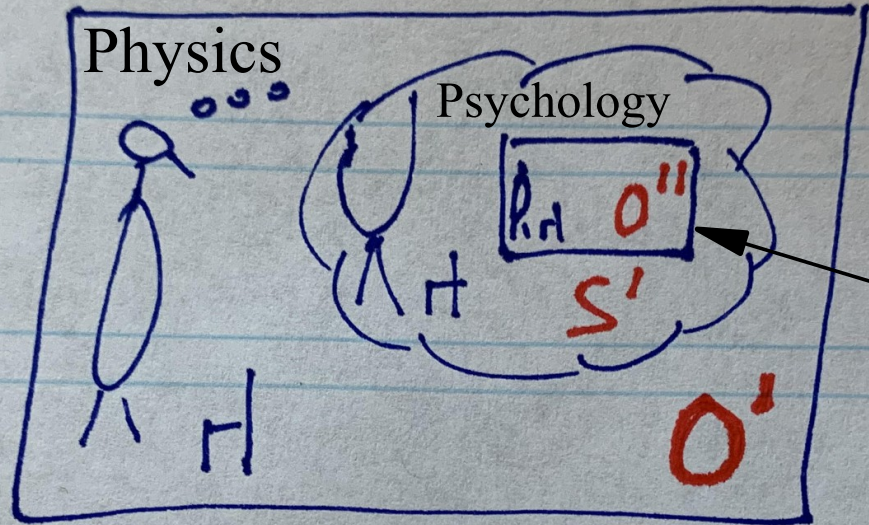
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Empirical Philosophy:  
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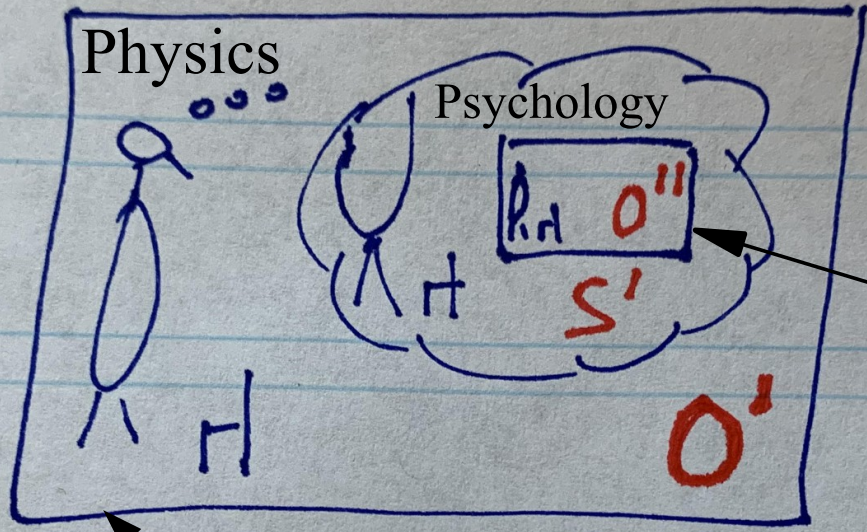
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Empirical Philosophy:  
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Neuro-  
science

Galileo's science filter

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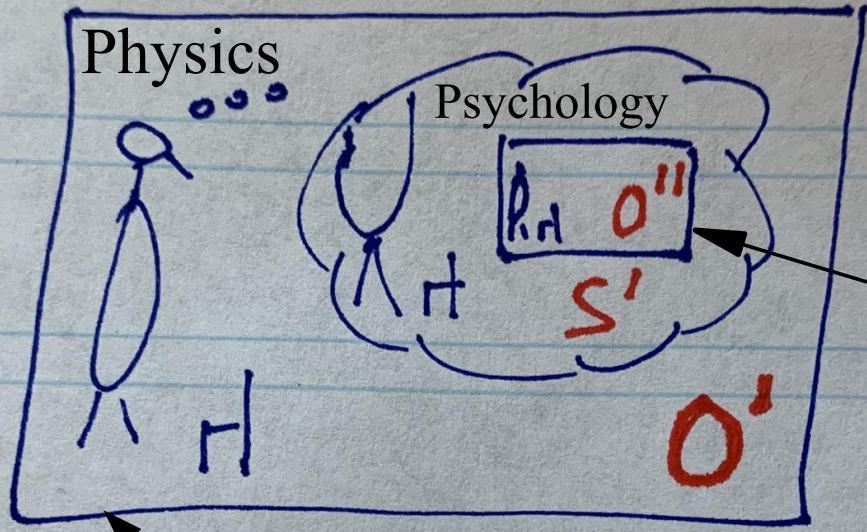
Empirical Philosophy:  
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Galileo's science filter

Husserl's experience filter

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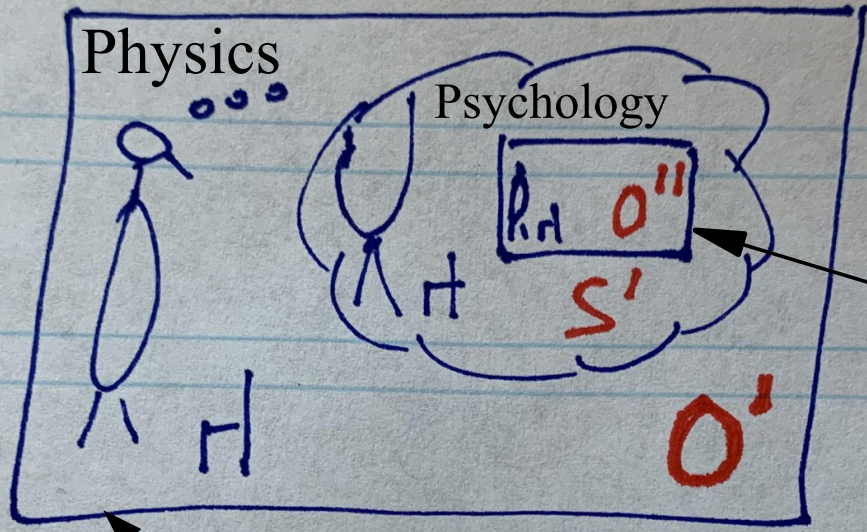
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Galileo's science filter

Husserl's experience filter

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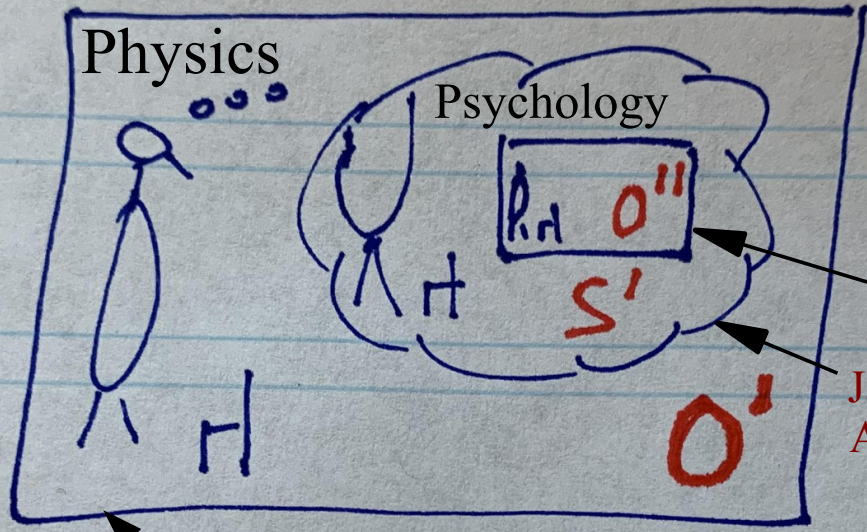
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Empirical Philosophy:  
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Galileo's science filter

{ Neuro-  
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James Gibson's  
Ambient Array  
Affordances  
Filter

Husserl's experience filter

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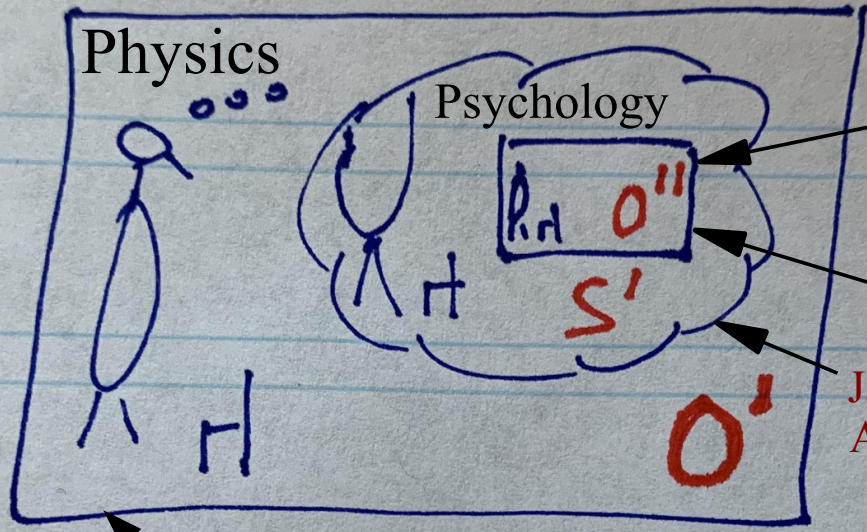
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Empirical Philosophy:  
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Place Cells  
Grid Cells

{ Neuro-  
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James Gibson's  
Ambient Array  
Affordances  
Filter

Galileo's science filter

Husserl's experience filter

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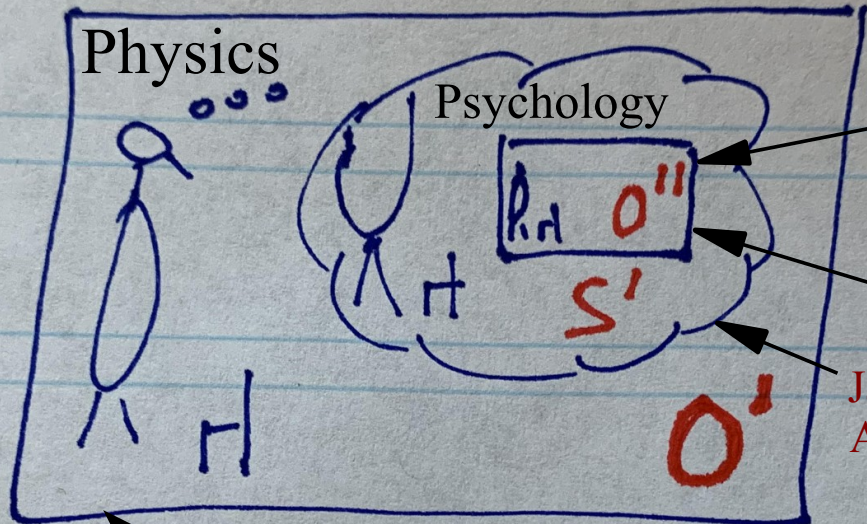
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Empirical Philosophy:  
aka Phenomenology

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Place Cells  
Grid Cells  
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{ Neuro-  
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James Gibson's  
Ambient Array  
Affordances  
Filter  
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Galileo's science filter

Husserl's experience filter

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Empirical Philosophy:  
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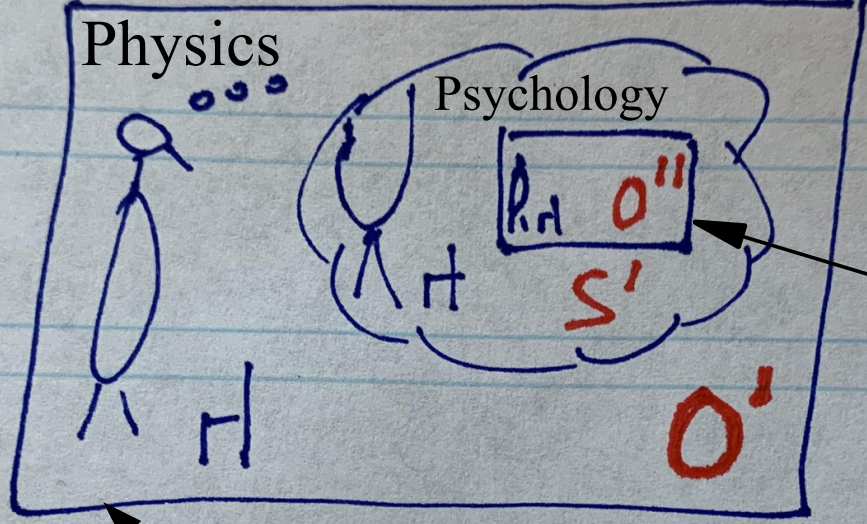
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Galileo's science filter (or prism)

Husserl's experience filter

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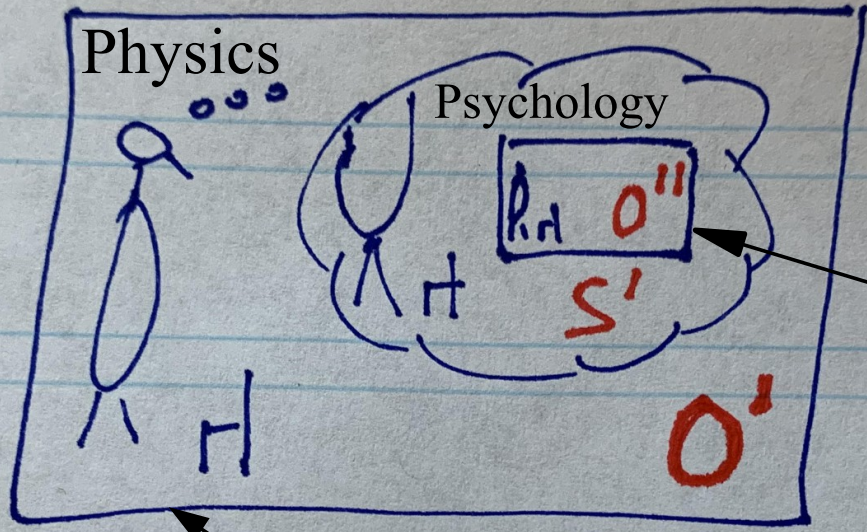
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Empirical Philosophy:  
aka Phenomenology

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{ Neuro-science

Galileo's science filter (or prism)  
[or polaroid glasses showing  
only 1 polarization direction]

Husserl's experience filter

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NON-DUALITY



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Empirical Philosophy :  
aka Phenomenology

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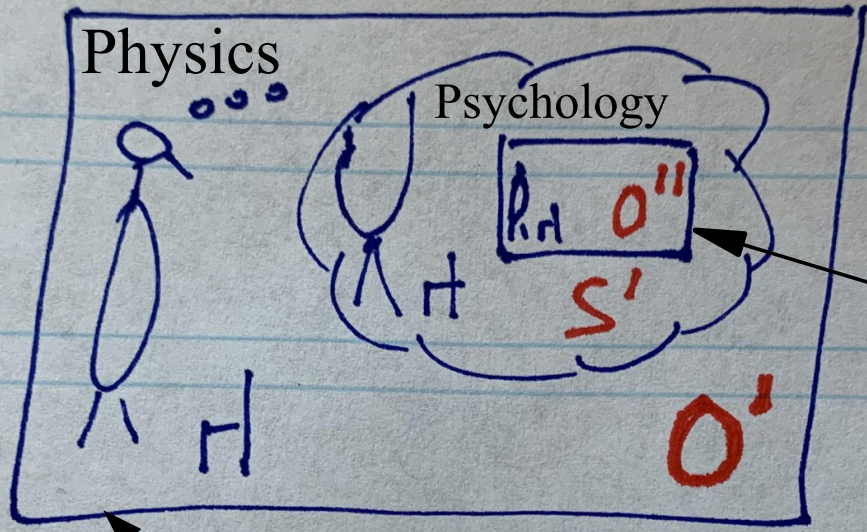
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Galileo's science filter

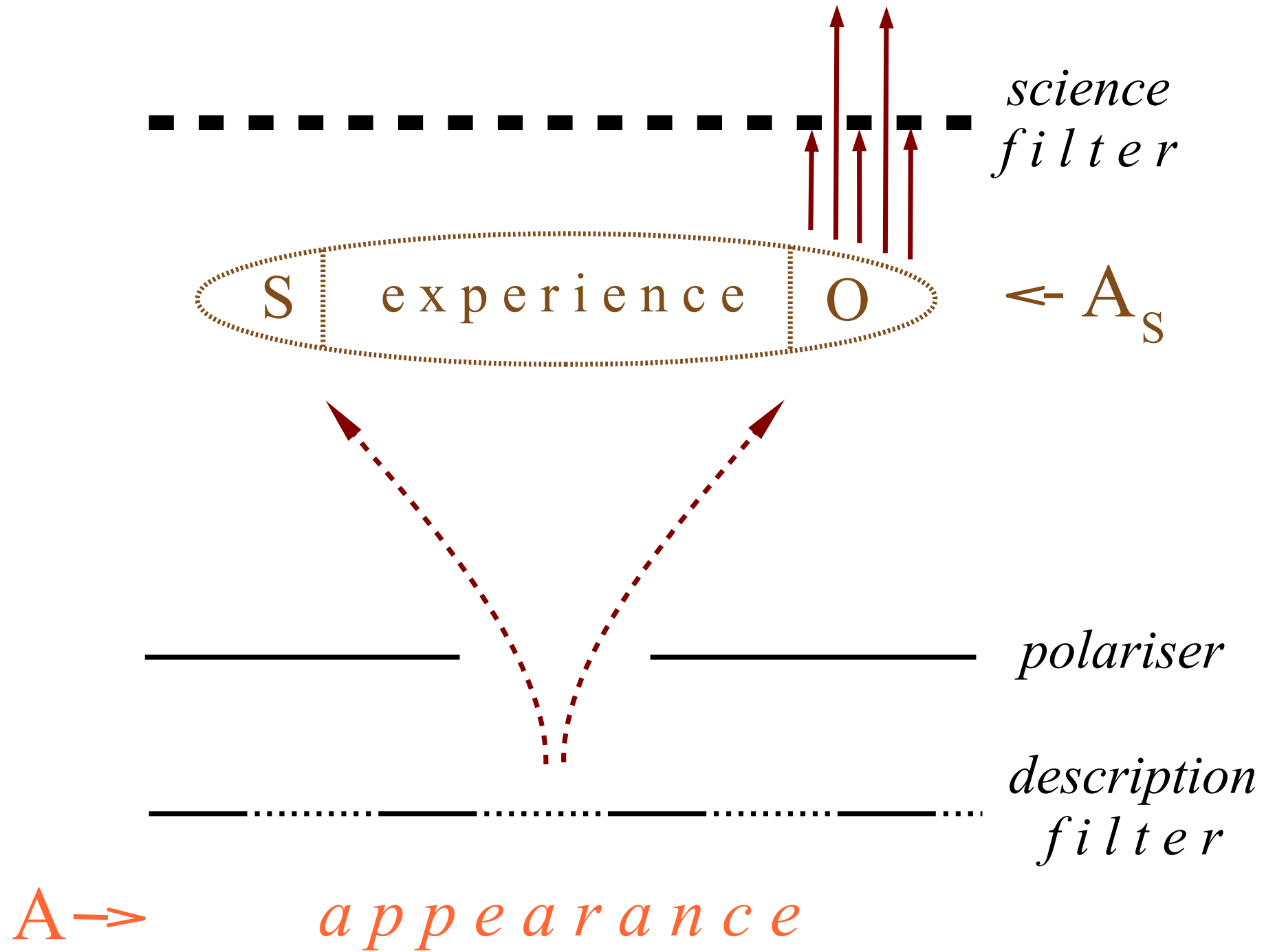
Husserl's experience filter :  
Cartesian polariser &  
description filter

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NON-DUALITY







# Science

