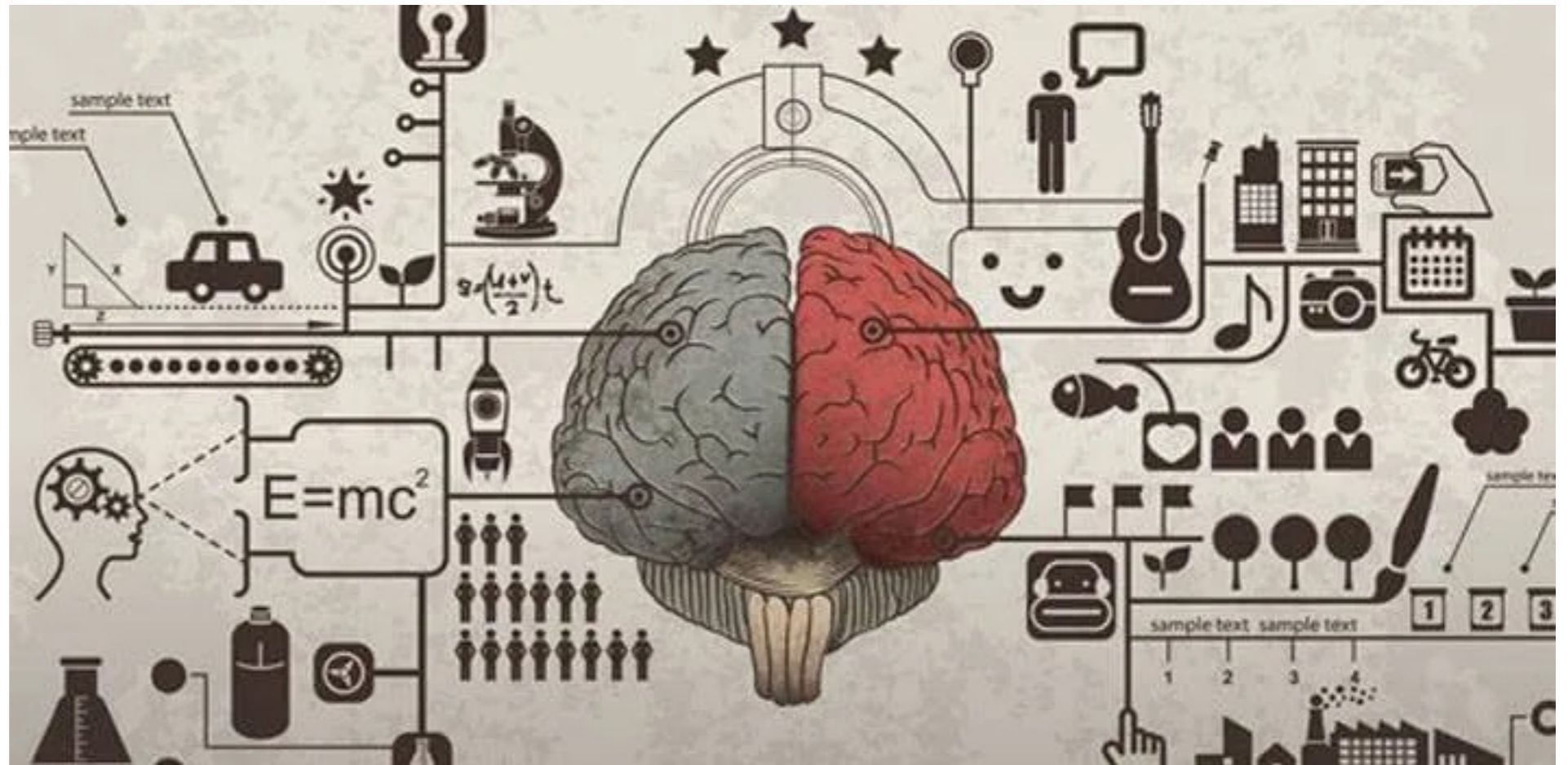# Time, Trust, And Physical Modality

Hall 2015: the "central, nonnegotiable idea" behind systems theory is that science's "implicit standards for <u>judging</u> lawhood are in fact <u>constitutive</u> of lawhood" (my emphasis).

That there are these standards is a substantive — but plausible — assumption.
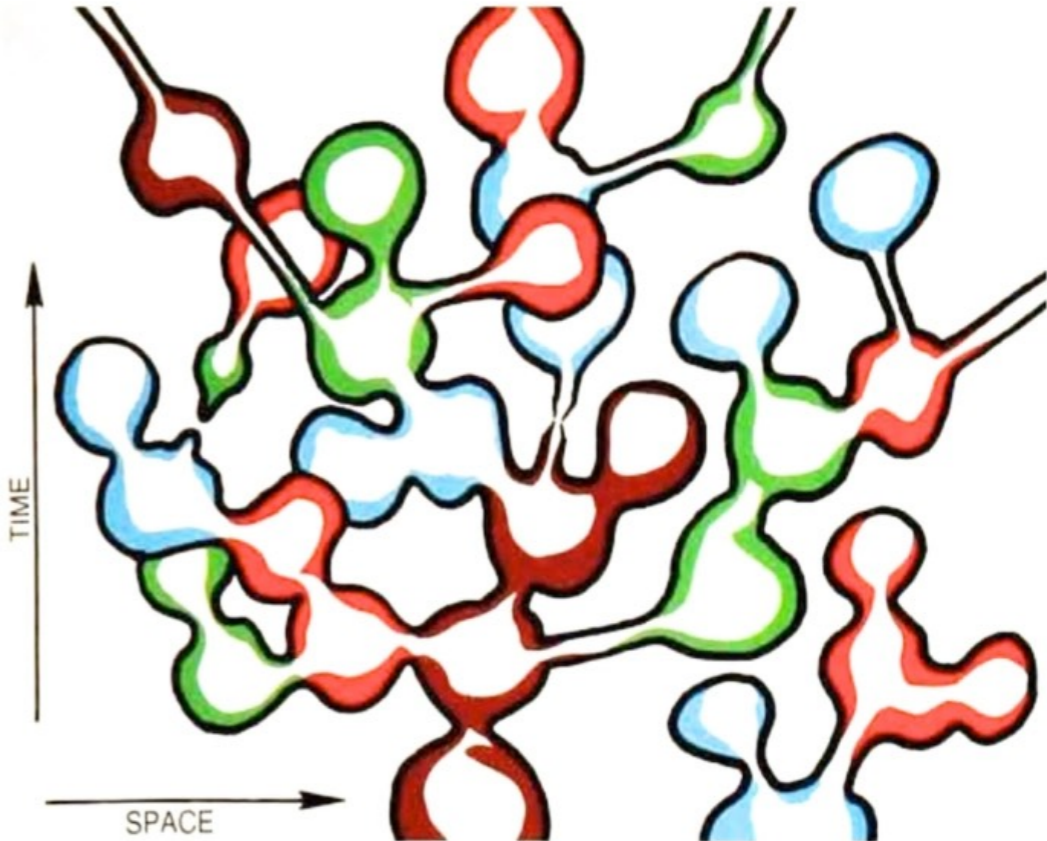
Best System Theory Of Laws Of Nature
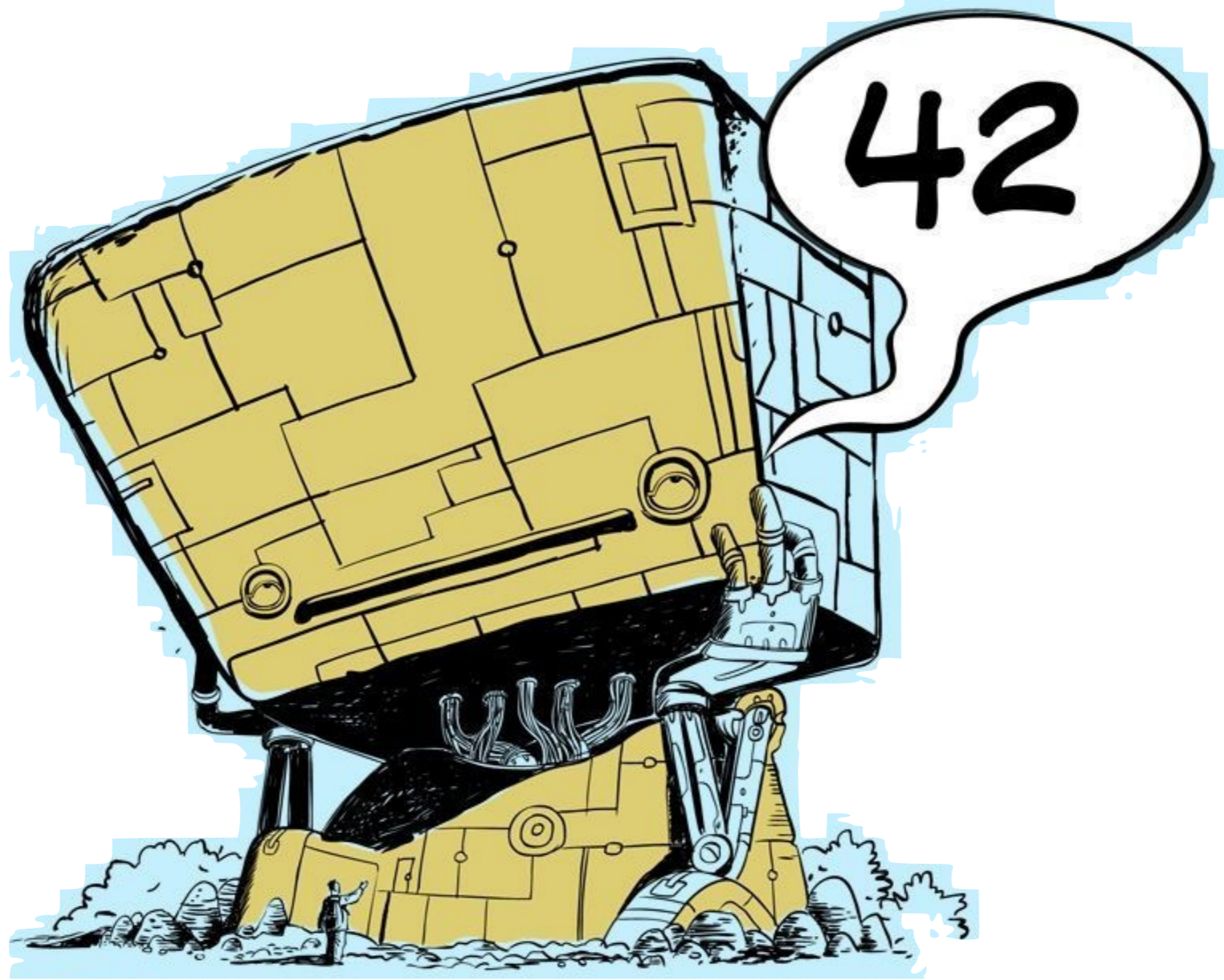
$$i\frac{\partial \psi}{\partial t} = H_t \psi$$

Ideal Observer:

Perfect understanding of

standards science uses

TIME

SPACE

Humean Mosaic

1. The Problem Of Alien Laws

"The Meaning Of Life, The Universe, And Everything"

Let Ideal Observer optimize Lewis' simplicity and strength in a theoretical system. Why would the Ideal Observer find laws that…

1. Apply to both systems and sub-systems?
2. Divide (free) initial conditions from (constrained) dynamics?
3. Require only initial conditions (and not final or middle conditions)?
4. Don't require detailed past data (i.e., are Markovian?)
5. Aren't "atemporal" (e.g. only Lagrangian schema)?
6. Require only spatially local bits of information to get <u>some</u> results?
7. Permit various types of error tolerance?
8. Can be approximately solved by tractable mathematics?
9. Enjoys various symmetries?
10. Employ polynomials of low order (2-4)?

See Elga 2007, Eddon and Meachem 2015, Hicks 2018, Hall 2015, Ismael 2009, Ismael 2015, Dorst 2019, Jaag and Loew 2020, Callender and Cohen 2009, Callender 2017, Callender 2022.
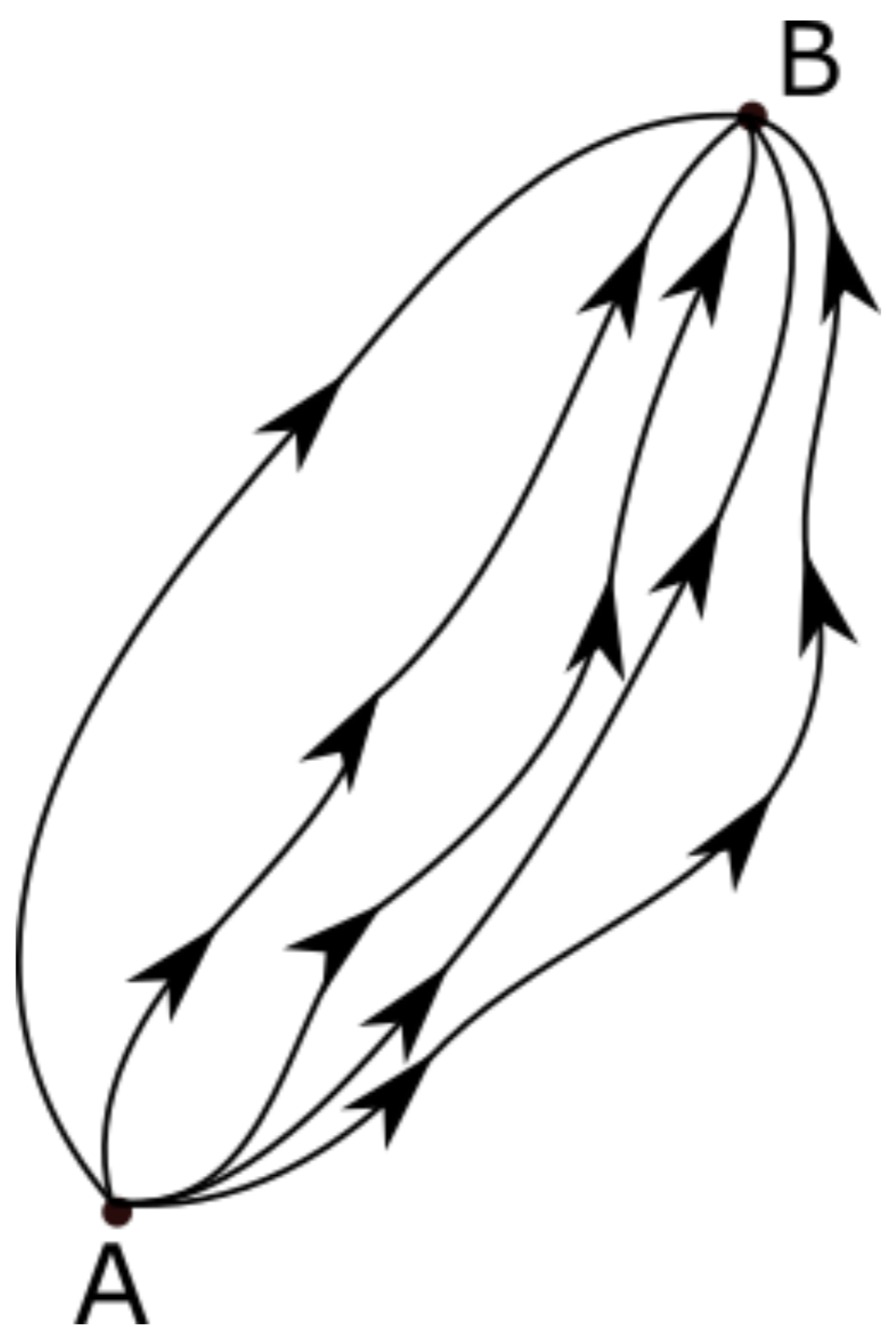
I don't care about these things

1. Apply to both systems and sub-systems?
2. Divide (free) initial conditions from (constrained) dynamics?
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Dirichlet Problem

Problem Of Alien Laws

The Laws Are…"42"

Descartes tried to link simplicity with the Markov property. That strategy of defense will not be possible for most items on our list.

The Ideal Observer has <u>no reason</u> to produce laws with any of the nice features that we prize in laws. She might produce laws that are <u>alien to us</u>, laws that have no epistemic or practical significance to us.

That ought to make us <u>suspicious</u>…

Let Ideal Observer optimize Lewis' simplicity and strength in a theoretical system. Why would Ideal Observer find laws that…

1. Apply to both systems and sub-systems?
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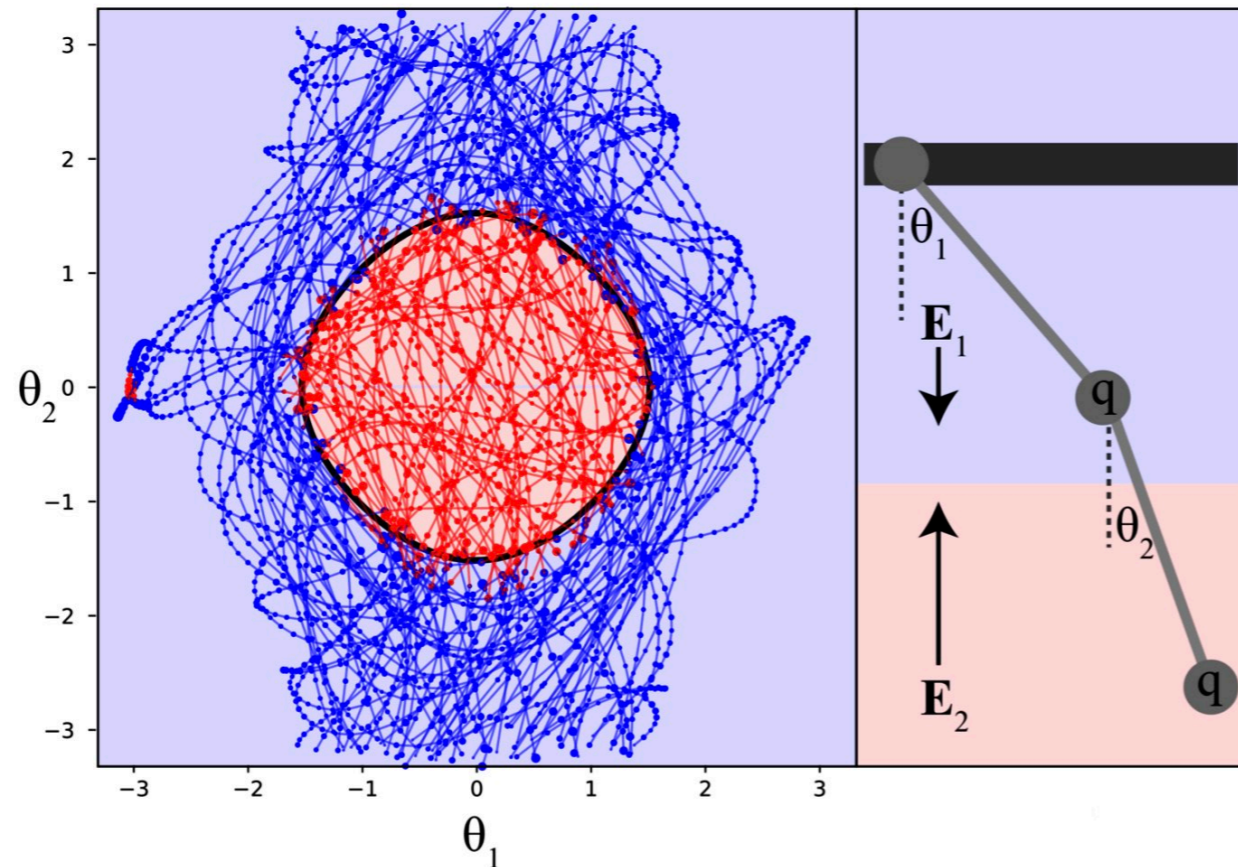
FIG. 5: In this mystery, a charged double pendulum moves through two different electric fields $\mathbf{E}_1$ and $\mathbf{E}_2$, with a domain boundary corresponding to $\cos\theta_1 + \cos\theta_2 = 1.05$ (the black curve above left, where the lower charge crosses the $\mathbf{E}$-field boundary). The color of each dot represents the domain into which it is classified by a Newborn agent, and its area represents the description length of the error with which its position is predicted, for a precision floor $\epsilon \approx 0.006$. In this world, the Newborn agent has a domain prediction accuracy of 96.5%.

Example: A.I. Science

"Toward an AI Physicist for Unsupervised Learning", Wu and Tegmark, 2019

2. Metaethics Interlude I

Ideal Observer Theory In Ethics

Adam Smith, Henry Sidgwick,

Robert Firth

Loosely, an act is good iff an ideal

observer approves of it.

In Firth's theory, the ideal observer is omniscient, disinterested, dispassionate, immune to subconscious effects, and perfectly consistent - but otherwise normal!

Ideal Observer Theory In Ethics

Main criticism: the ideal observer's judgements may be alien to us

Ideal Advisor Theory

Railton 1986

Replaces ideal observer with ideal advisor. What does ideal advisor want <u>for you</u>? She takes into account your psychological traits, motivational system, history… For Railton, we hold the non-moral features of a person "as nearly constant as possible when asking what someone like him would come to desire."

3. Pragmatic Humeanism

you explain to God that you're actually a bit pressed for time, that this is not all you have to do today, that you are not going to be in a position to hear out the whole story. And you ask if maybe there's something meaty and pithy and helpful and informative and short that He might be able to tell you about the world which (you understand) would not amount to everything, or nearly everything, but would nonetheless still somehow amount to a lot. Something that will serve you well, or reasonably well, or as well as possible, in making your way about in the world. (Albert 2015, 23)

To the Humean, the solution is staring back at us from the mirror: laws are useful, and they're laws partly because they're useful

1. Apply to both systems and sub-systems?
2. Divide (free) initial conditions from (constrained) dynamics?
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10. Employ polynomials of low order (2-4)?

Laws are "partially prepared solutions to frequently encountered problems" (Ismael 2015, 197)

Ideal Observer:

Perfect understanding of
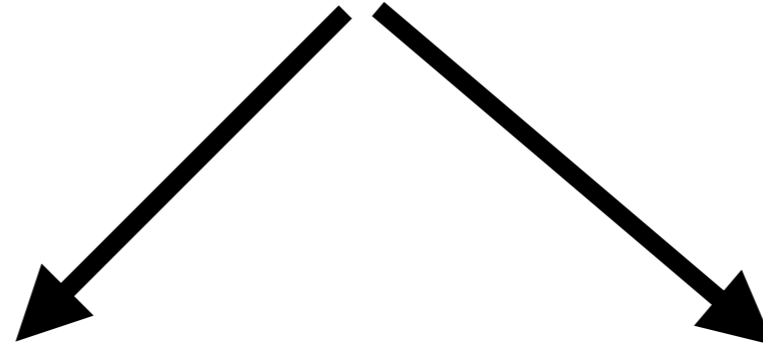
standards science uses

Pragmatic Humean:

Takes you into account

I'm *burp* Barfalina, the hangover fairy.. *burp*

Earman, Ismael, Cohen & Callender, Eddon and Meachem, Dorst, Jaag and Loew, Hicks

4. Metaethics Interlude 2

Hume's externalism

ideal observer theory

cognitivism

Hume's internalism

Ayer's emotivism, Stevenson's expressivism, Hare's Prescriptivism

non-cognitivism

Hume's externalism

ideal observer theory

cognitivism

Hume's internalism

expressivism

non-cognitivism

Railton

ideal advisor theory
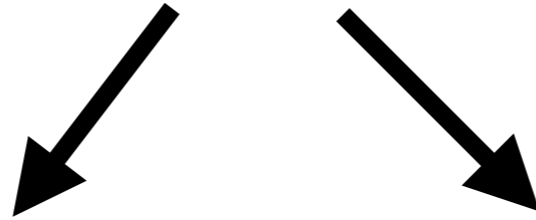
cognitivism

Gibbard, Blackburn

sophisticated
expressivism
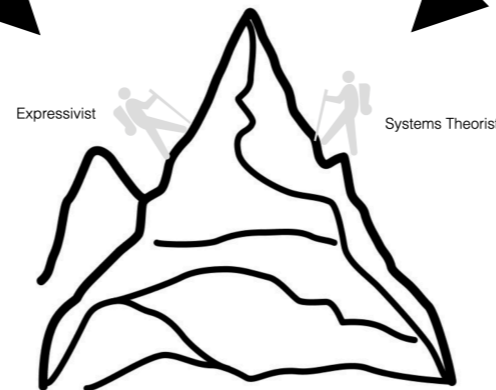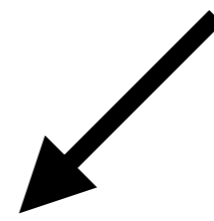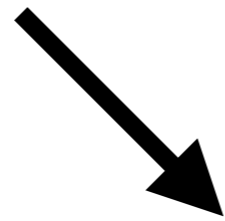
non-cognitivism

Expressivist

Systems Theorist
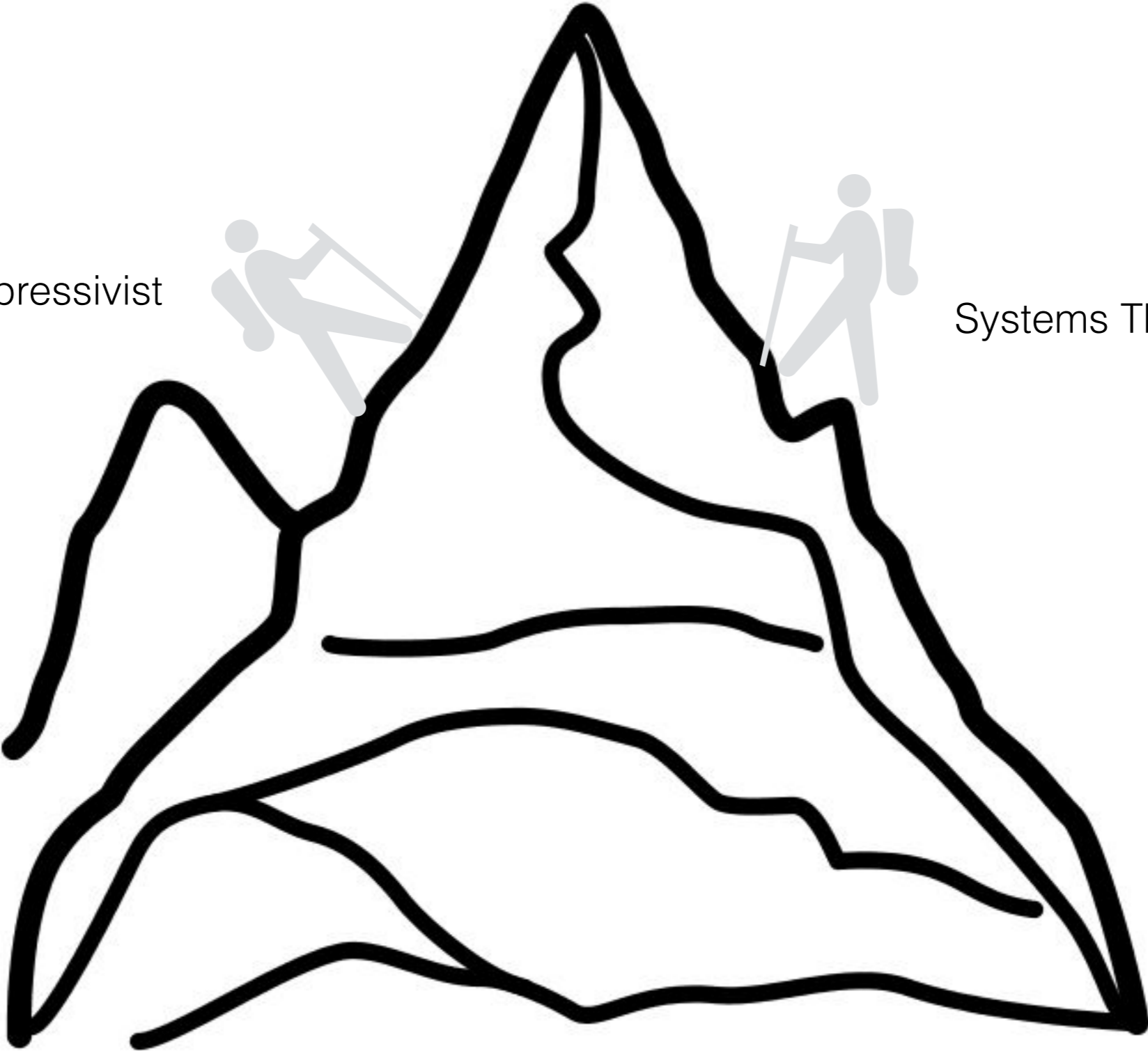
Hume's externalism

Cognitivism

ideal observer theory

Hume's internalism

Noncognitivism

Ayer's emotivism, Stevenson's
expressivism, Hare's Prescriptivism

Ideal Advisor Theory

Sophisticated Expressivism
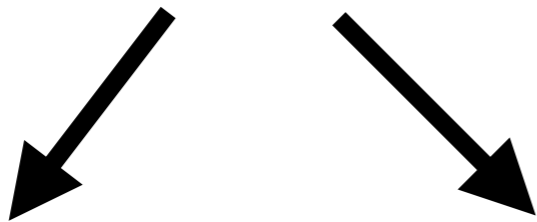
Expressivist

Systems Theorist

5. Back To Laws

Projectivism

Laws are guides to the future. They are not truth evaluable. Yet there are rules for how law-discourse works. Ayer, Ramsey, Blackburn, Ward. Saying a generalization is a law is a recommendation that using it will be fruitful to explanation and prediction. It is an endorsement.
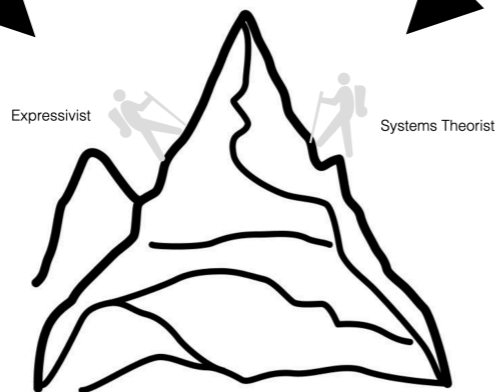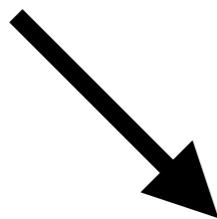
**Hume's externalism
Cognitivism**

Mill-Ramsey-Lewis

**Hume's Projectivism
Noncognitivism**

Ayer on laws of nature
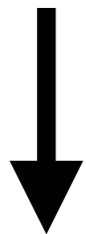
Ideal Advisor Theory
Pragmatic Humeans

Sophisticated Expressivism
Ramsey, Blackburn, Ward

Expressivist

Systems Theorist

Pragmatic Humean:

ideal advisor produces laws that are useful for actual scientists in prediction and explanation

Sophisticated Expressivist:

laws are endorsements for best thing to use for prediction and explanation

Diagnosis:

We didn't see this coming because the internalist, motivational aspects of natural modality weren't so well appreciated. The problem of alien laws makes the normative force of laws apparent — we expect them to help us navigate through life.

That laws must be relevant to agents is a constraint on laws much like the Principal Principle is one on chance.

Callender, 2022, "Humean Laws of Nature: The End of the Good Old Days"

XXX, "The Normative Force of Natural Laws"

6. Finally, Time
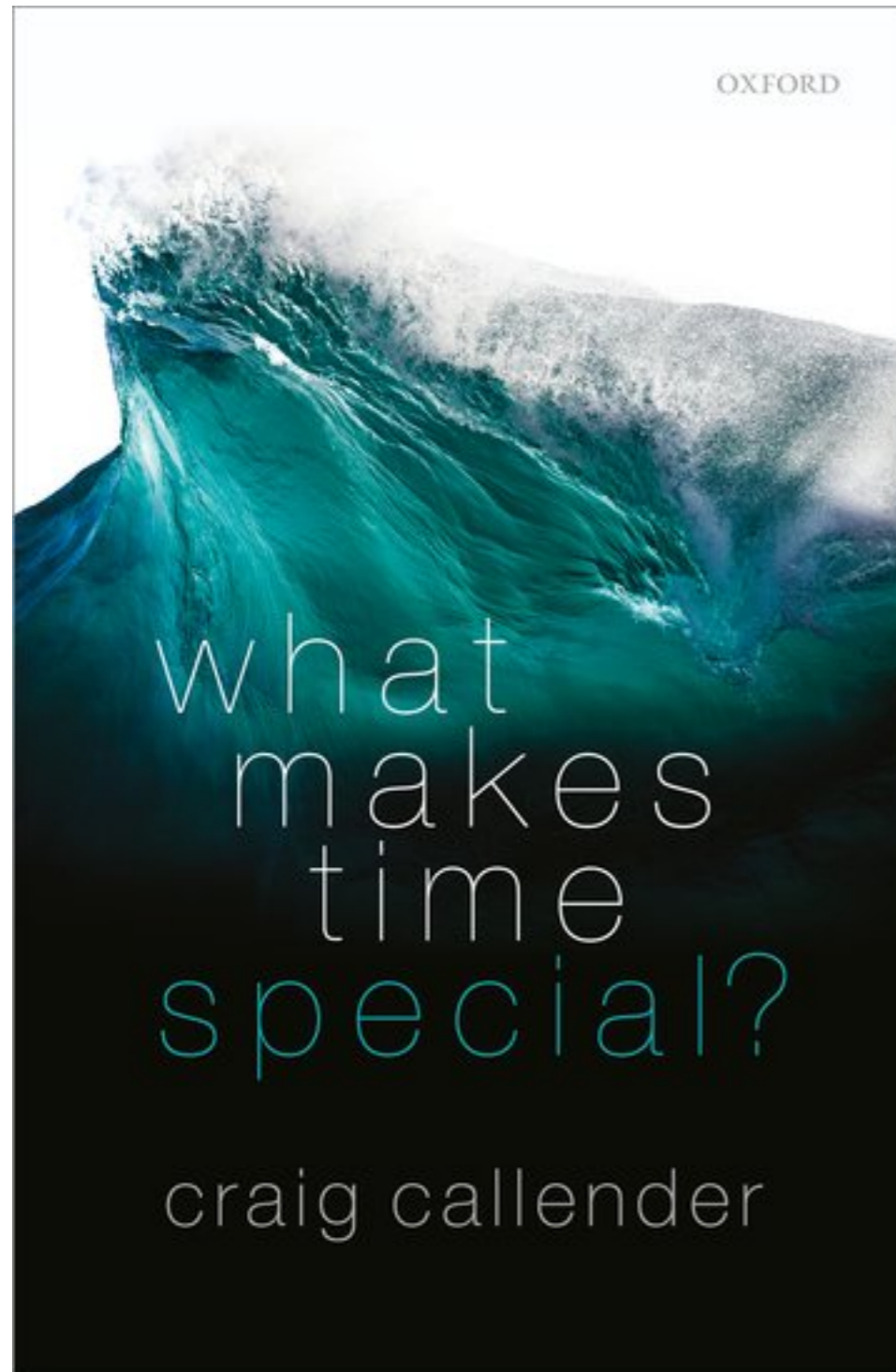
Huw Price

"It seems a reasonable bet that our own temporal character will play a central role in any plausible pragmatic theory of modality. That's the sense in which time makes these questions about modality special."

Review, *Philosophical Review*

Why Did Ramsey Switch From A Systems View To A Projectivist View Of Laws?

I, therefore, put up a different theory by which causal laws were consequences of those propositions which we should take as axioms if we knew everything and organized it as simply as possible in a deductive system.

What is said above means, of course, a complete rejection of this view (for it is impossible to know everything and organize it in a deductive system) and a return to something nearer Braithwaite's. A causal generalization is not, as I then thought, one which is simple, but one we trust (cf. the ages at death of poets' cooks). We may trust it because it is simple, but that is another matter (emphasis mine).

…such a conjunction is distinguished from others in that we trust it to guide us in a new instance…

"General Propositions and Causality" 1929

As opposed to a purely descriptive theory of science, mine may be called a forecasting theory. To regard a law as a summary of certain facts seems to me inadequate; it is also an attitude of expectation for the future.

"General Propositions and Causality" 1929

Ramsey would answer Hempel's problem by saying we trust the 'no mile diameter uranium sphere' claim more than the 'no mile diameter gold sphere' claim as we form beliefs about the future.

Interesting, plausible position. Fruitful — *what are the reasons for trust?* Usefulness for agent…

Puts central Humean concern — the inductive leap — at the center of lawhood, as well as agency and time.

Nicely handles Problem of Alien Laws

Taking The Temporal Predicament Of Agents Seriously Is Central To Understanding Physical Modality