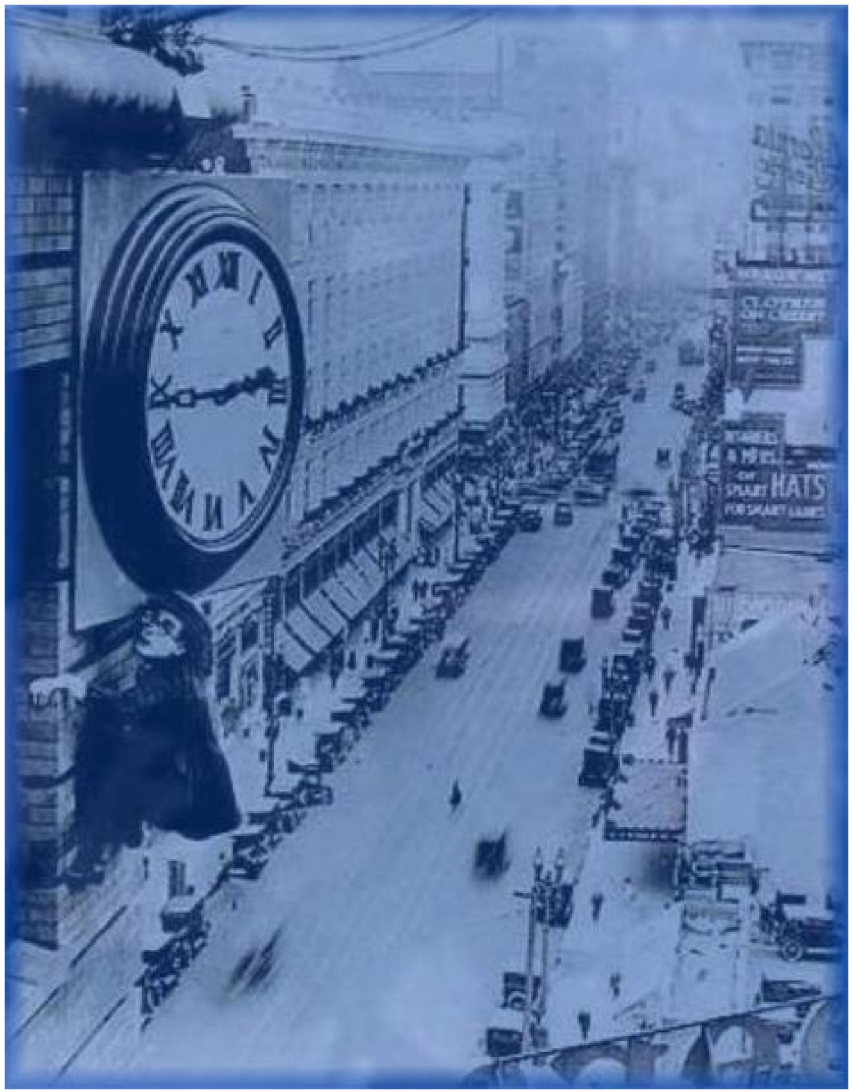
Philosophy of Time

Christian Wüthrich

http://philosophy.ucsd.edu/faculty/wuthrich/

14 The Nature of Reality



"Time is a great teacher, but unfortunately it kills all its students."

Hector Berlioz

Many questions...

- Does time pass? If so, what does this mean? If not, why does it feel that way?
- Is only the present real? Or are past or future real as well?
- Is time finite or infinite? Does it have beginning and end?
- directedness *of* time vs. directedness of anything *in* time
- 'flow' of time, 'passing' of time
- Is temporal passage an objective feature of reality?
- seemingly simple questions about most fundamental aspects of our world, relevant to anyone who seeks understanding of cosmos and our place in it, yet very hard to answer!

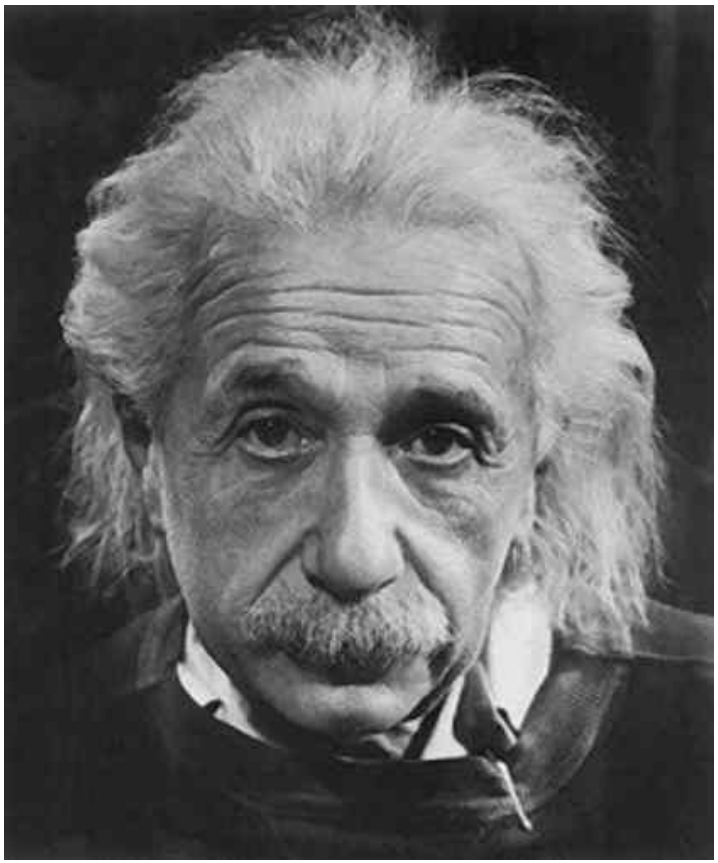
St Augustine (354-430), Bishop of Hippo

"What, then, is time? If no one asks me, I know what it is. If I wish to explain it to him who asks me, I do not know. Yet I say with confidence that I know that if nothing passed away, there would be no past time; and if nothing were still coming, there would be no future time; and if there were nothing at all, there would be no present time." (*Confessions*, 11.xiv.17)

Sir Isaac Newton (1642-1727)

"Absolute, true, and mathematical time, of itself, and from its own nature flows equably without regard to anything external, and by another name is called duration: [Absolute time is to be contrasted with] relative, apparent, and common time, [which] is some sensible and external (whether accurate or unequable) measure of duration by the means of motion, which is commonly used instead of true time; such as an hour, a day, a month, a year." (*Principia Mathematica* (1687), Scholium to Definitions)

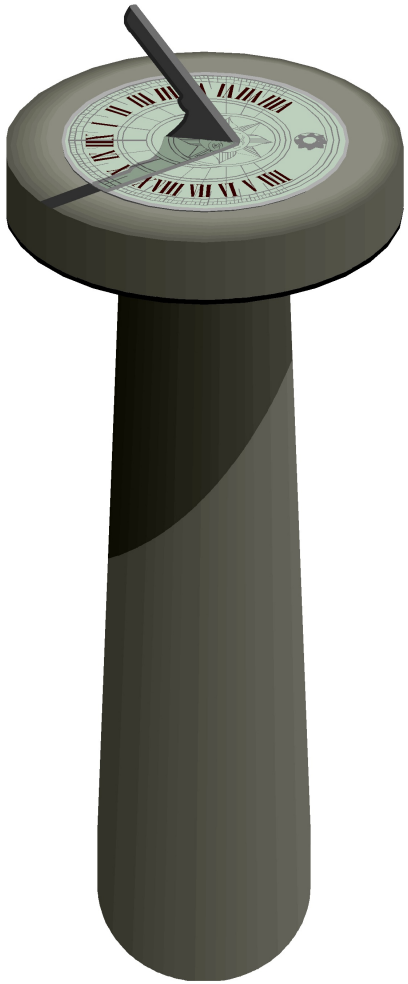
Albert Einstein (1879-1955)



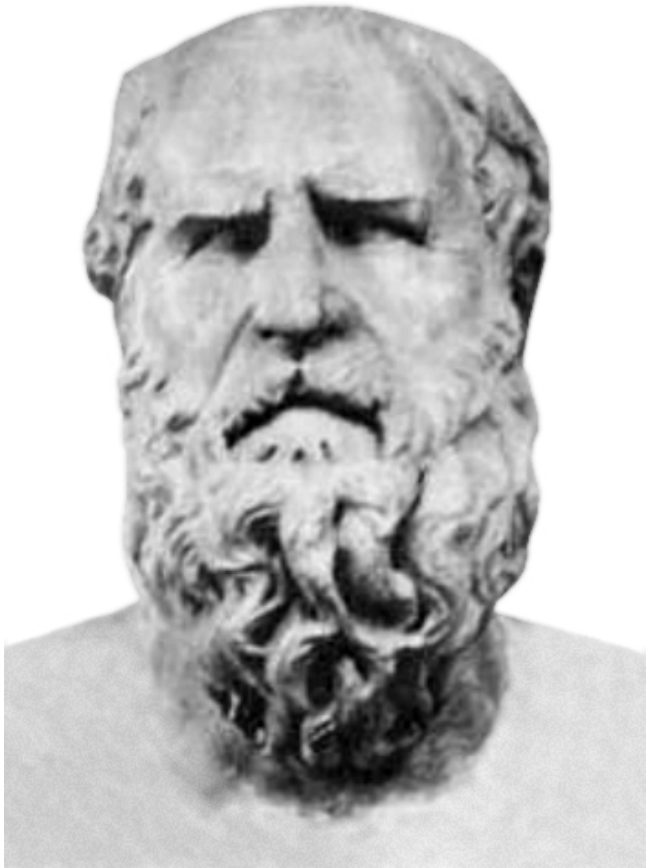
- “Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind union of the two will preserve and independent reality” (Hermann Minkowski, “Space and time”, 1908)
- “For us believing physicists, the separation between past, present, and future is only an illusion, although a persistent one.” (Einstein, in a letter of condolence, 21 March 1955)

The problem

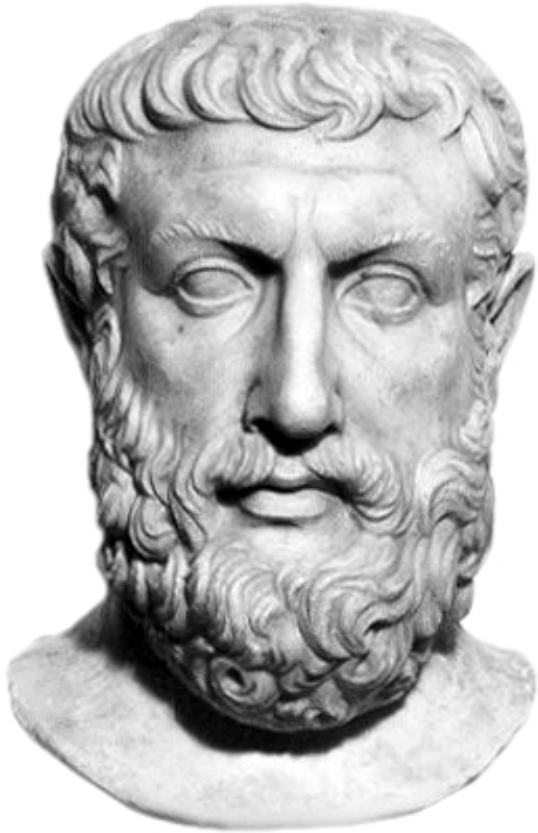
- The manifest image is teaming with activity. Objects are booming and buzzing by, changing their locations and properties, vivid perceptions are replaced, and we seem to be inexorably slipping into the future. Time—or at least our experience in time—seems a very busy and complicated sort of thing.
- By contrast, time in the scientist image is very peaceful. The '*t*' in the fundamental equations of physics doesn't differentiate between past and future, nor does it speed up or slow down, nor does it pick out which time is now.
- We seem to have, to echo another debate, an 'explanatory gap' between time as we find it in experience and time as we find it in science.



A related debate: Heraclitus vs. Parmenides



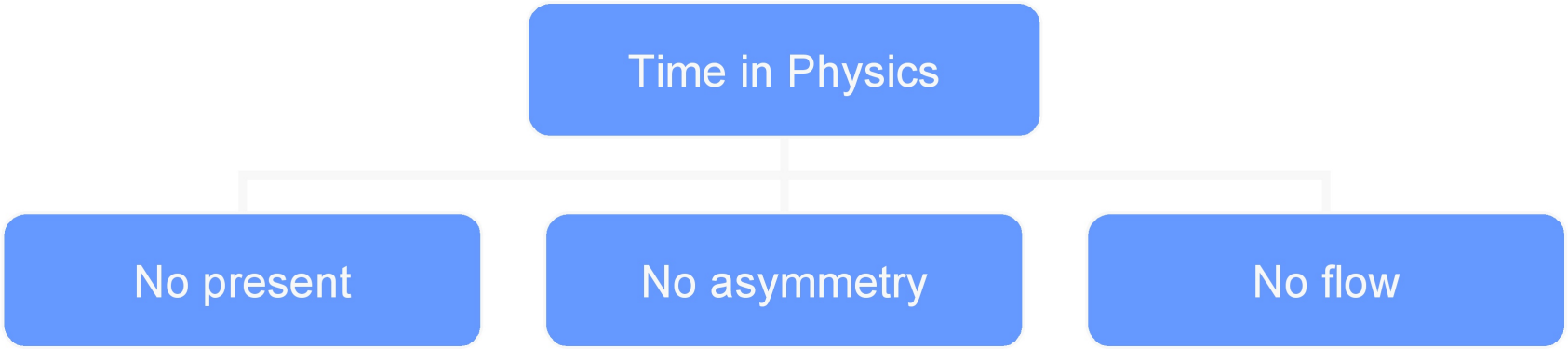
Heraclitus of Ephesus
(∼ 540-480 BCE)



Parmenides of Elea
(∼ 510-450 BCE)

Problem...

Time in physics is (at best) a non-unique 1-dimensional parameter that partially orders 3-dimensional spatial slices.



Is physics incomplete or inaccurate? Has it missed the properties of time that cause these experiences? Or is the time of physics all the objective time needed, where the rest can be explained with psychology, environmental facts, and complicated interactions among them? I.e., is the tensed or tenseless view of time is correct?

The basic opposition

Static view of time

- static time
- tenseless time
- B-theory
- block universe
- spacetime theory, space and time more alike

Dynamic view of time

- dynamic time
- tensed time
- A-theroy
- presentism, becoming,...
- space and time radically different

Position (Dynamic view of time)

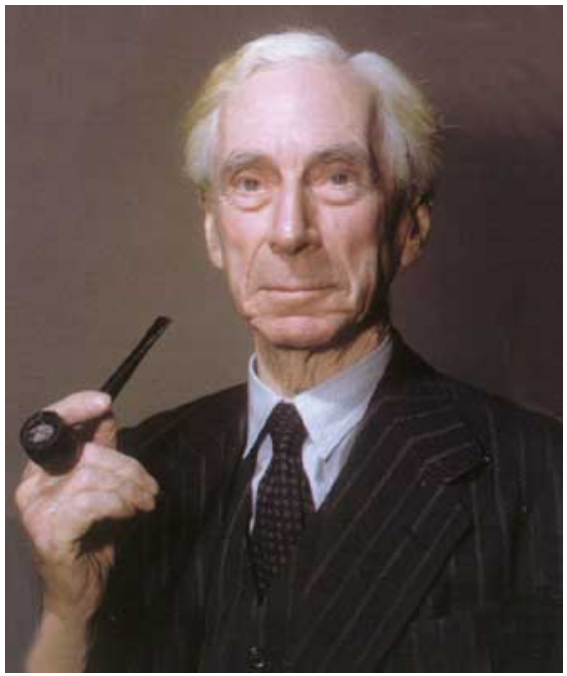
Temporal passage is objective feature of reality, which is independent of perspective that conscious beings may take. On this view, passage can be understood differently: either there's a 'moving present', a succession of ephemeral presents; or there's irreducible 'becoming' which turns future, as of yet non-existing events into the present (and thus into existence), from which they recede into ever more distant past.

Position (Static view of time)

There's no temporal passage qua *objective feature of world. There's no moving or changing present; all events are equally real; difference between past, present, and future merely matter of perspective. Time and space are ontologically equivalent in a crucial way: space = 3dim arrangement of coexisting locations (places), time = linear 1dim series of coexisting locations (times), and none of these locations is privileged.*

Tenseless time

- The past, present and future ‘equally’ exist.
- The categories past, present and future are not the fundamental temporal properties for the detenser. The fundamental temporal properties are the famous ‘B-relations’ of McTaggart: before, after, and being simultaneous with. ‘Past’ and ‘future’ are understood like ‘right’ and ‘left’, i.e., relationally.
- The present according to the tenseless view is not at all metaphysically special, since the present for some event is merely those events simultaneous with it (or something more complicated along these lines).
- Russell, D.C. Williams, Adolf Grünbaum,...



H G Wells, *The Time Machine*

Tenseless, 4d view of time existed before Einstein!

Online version of book

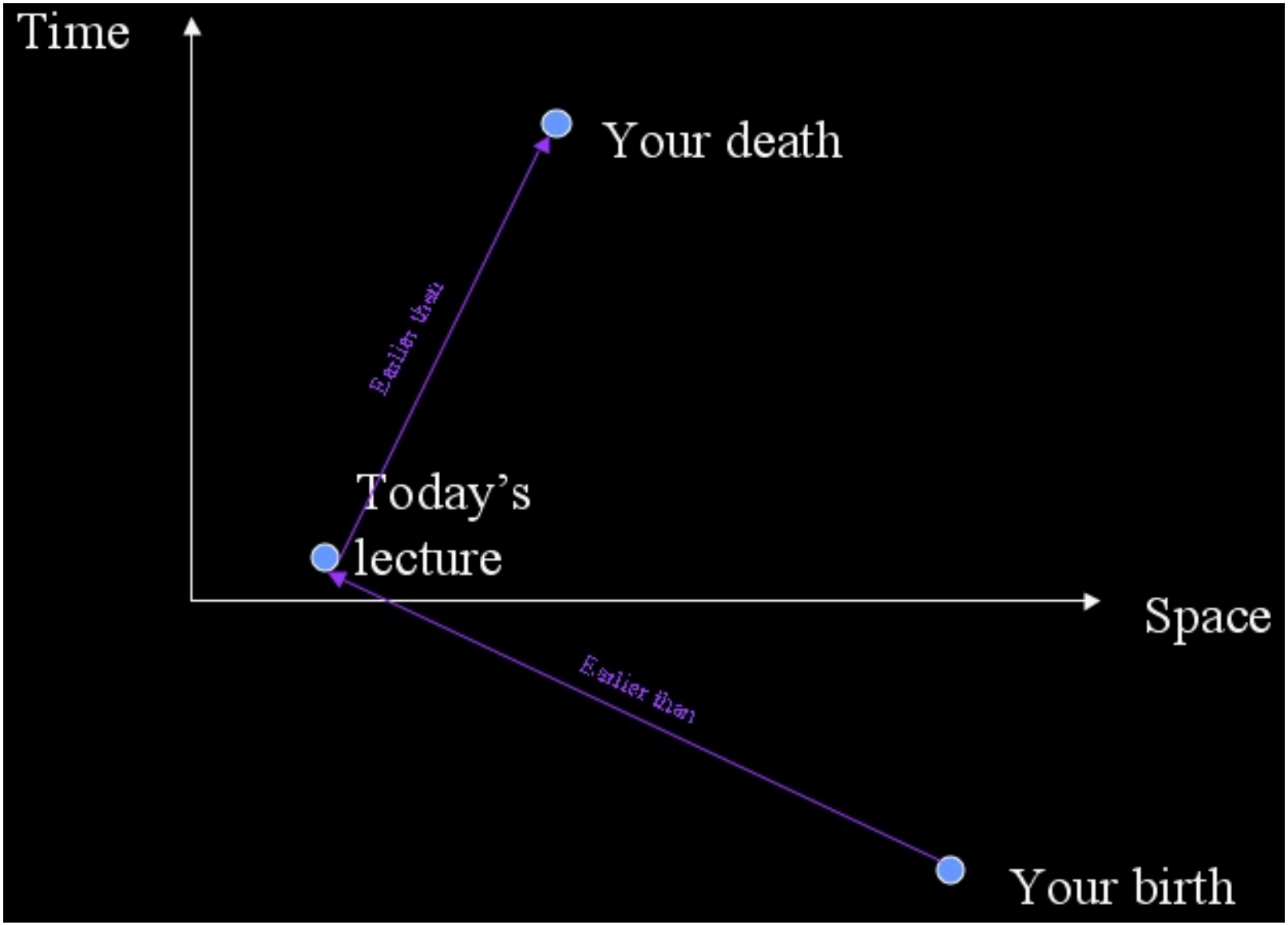
Some basics about higher dimensions

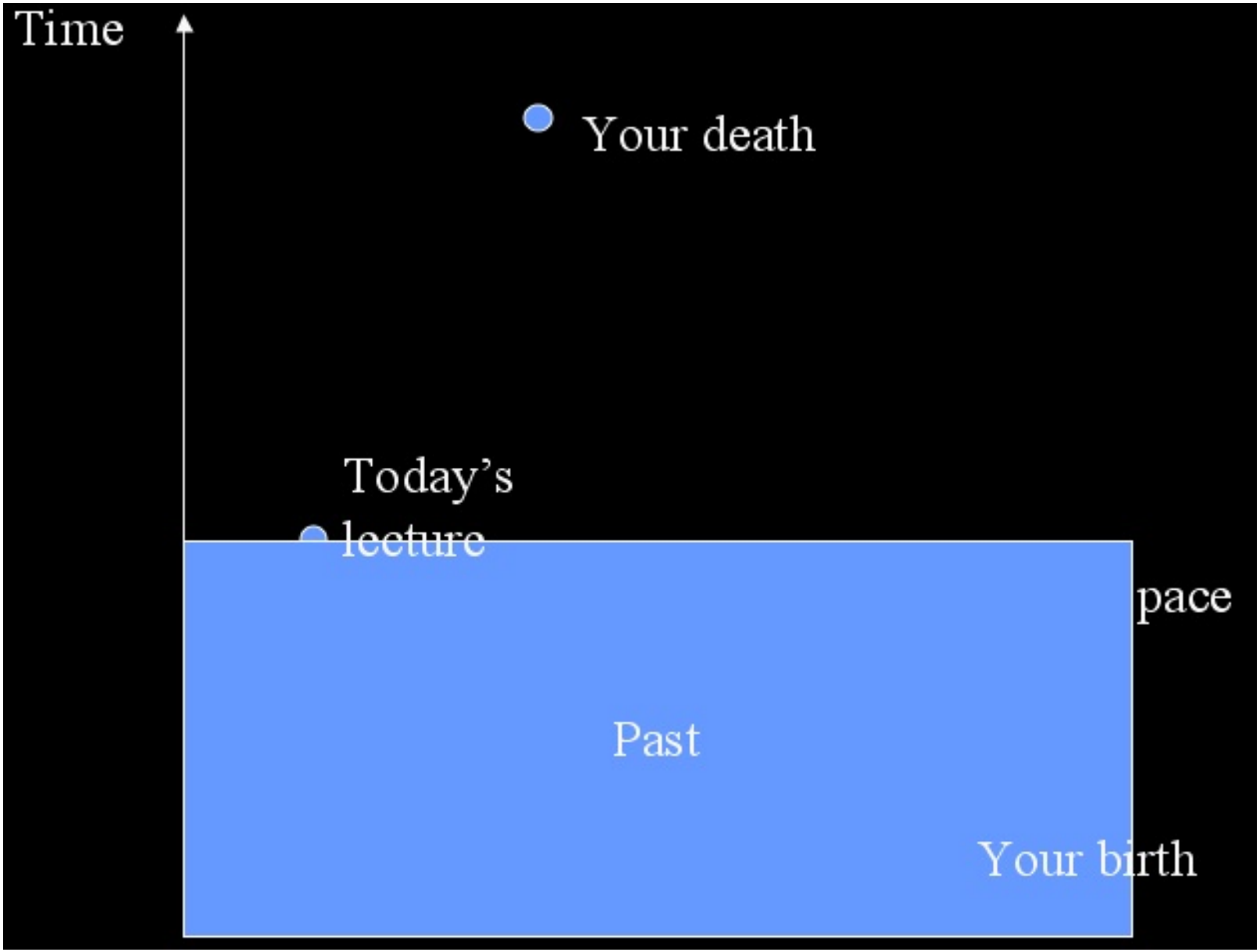
Dimensional basics

Slices of a sphere

Everting a sphere

Graphically everting a sphere


Time
Your death
Earlier than
Today's
lecture
Space
Earlier than
Your birth


Time
Your death
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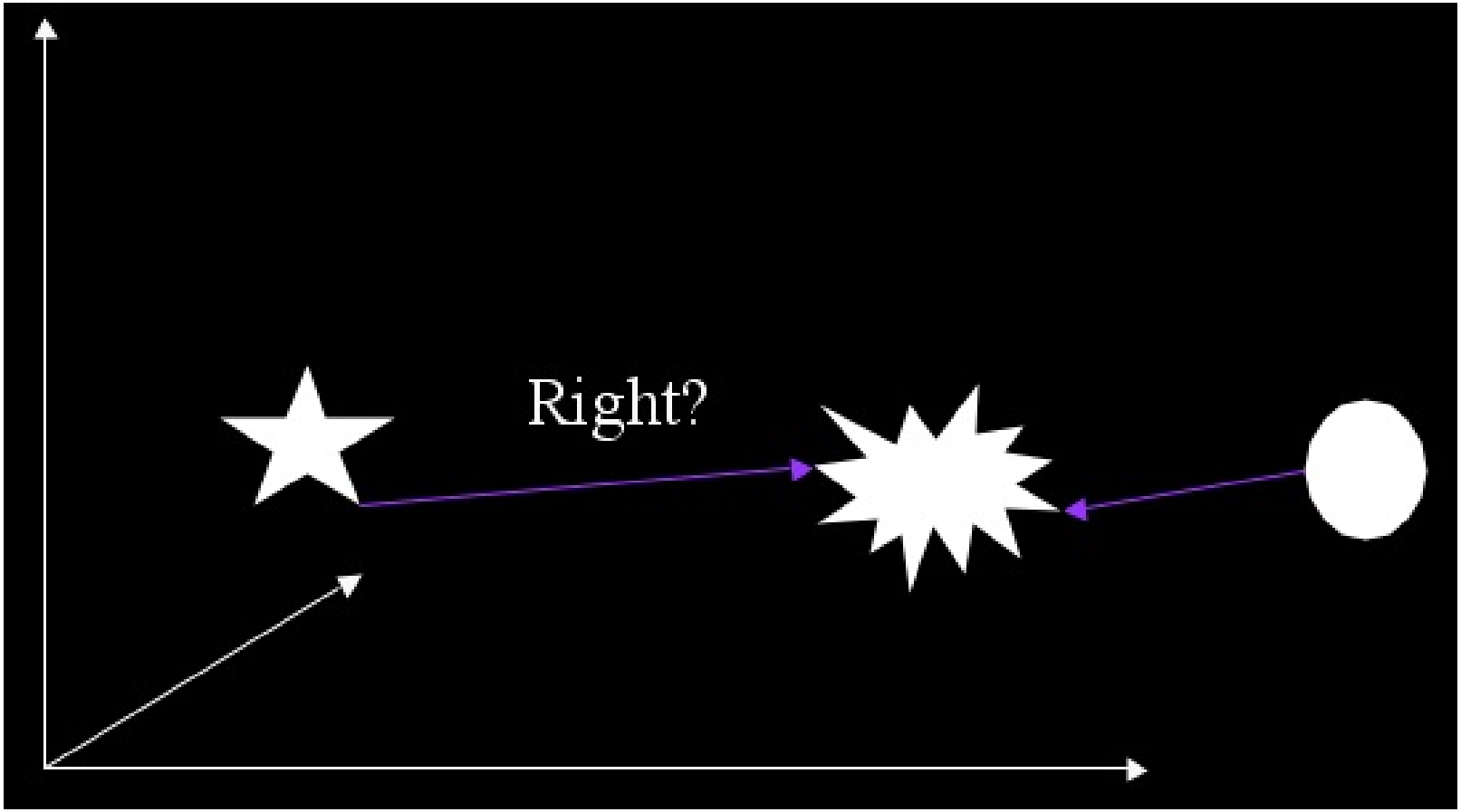
Past
Your birth



‘Right’ is a relational property or predicate

B-properties

B-properties are relational:

Space

- to the right of
- to the left of
- to the north of
- to the south of

Time

- earlier than
- later than
- simultaneous with
- 100 years earlier than

A-properties

A-properties are ‘monadic’:

Space

- here
- there

Time

- past
- present, now
- future

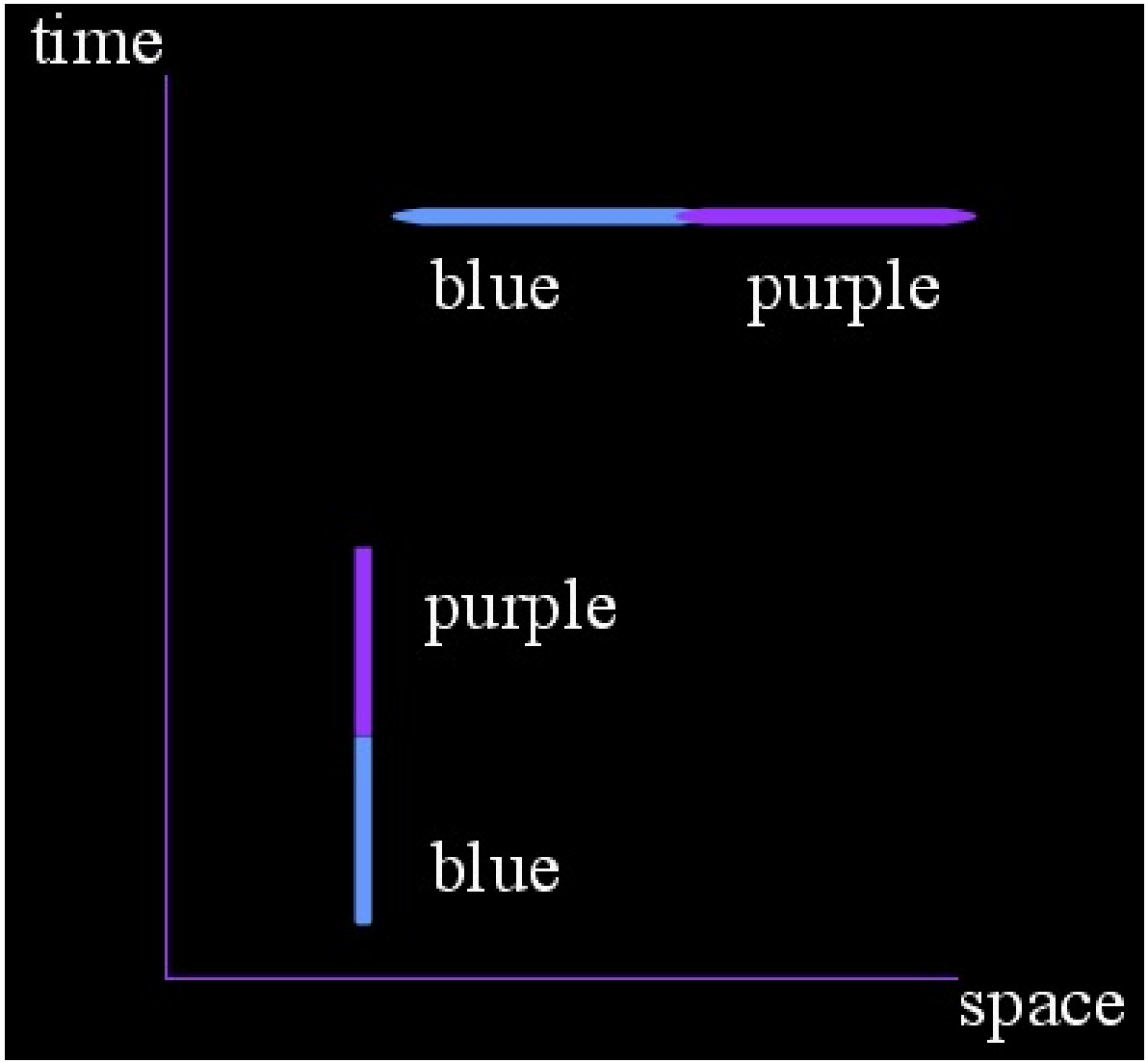
The tenseless theory of time

- The fundamental temporal properties are the temporal relations of earlier than, later than, and simultaneous with. (The monadic predicates are just loose shorthand ways of speaking.)
- Events earlier and later than current events ‘equally’ exist.
- No flow, no becoming, no Now

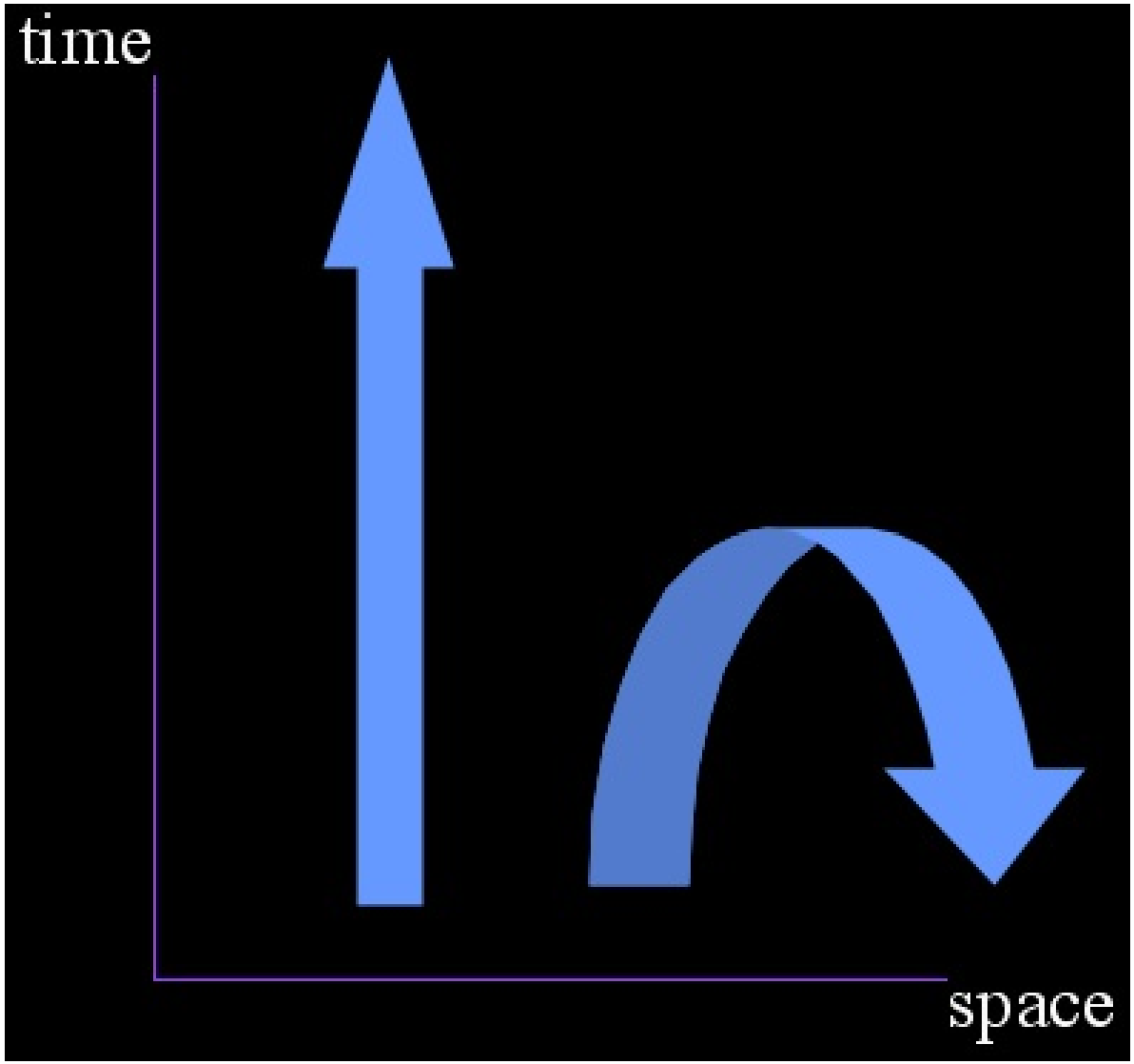
Objections to the tenseless theory

1. Change
2. Motion
3. Causes
4. Asymmetries

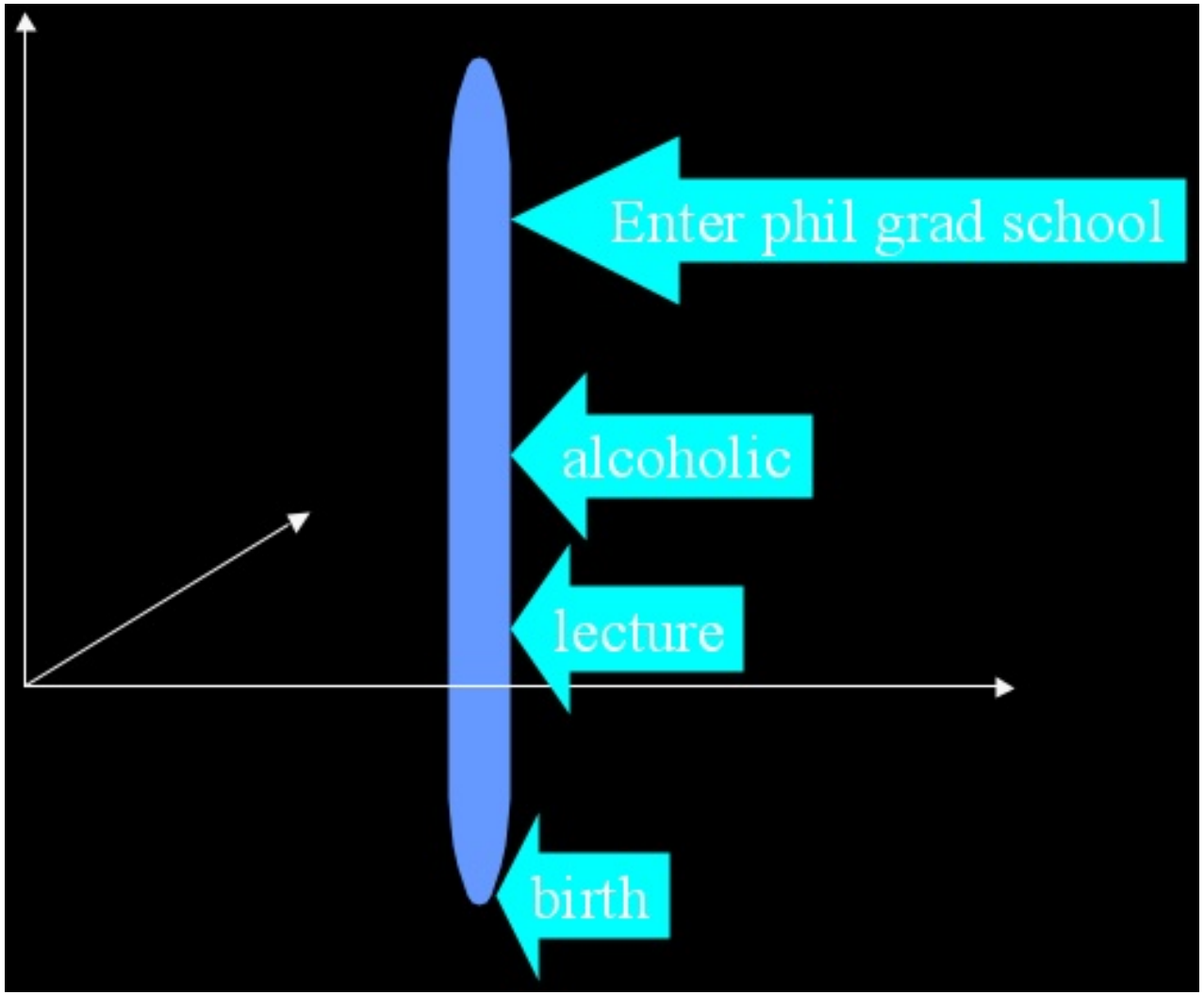
(1) Change



(2) Motion



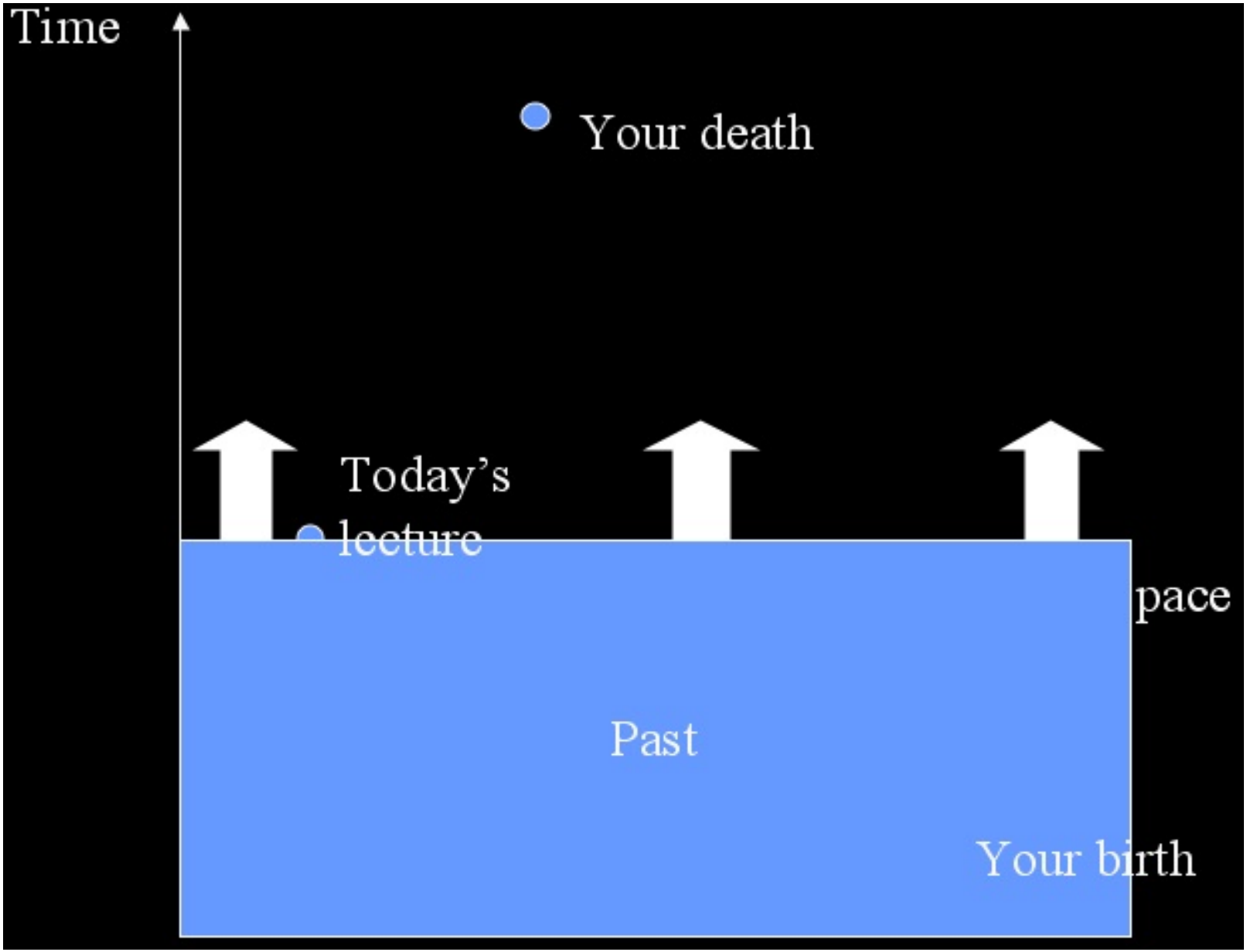
A 4-dimensional version of you



Tensed time

- There are many tensed theories: presentism, becoming,...
- In all, the present is special: it may be the only time that exists, or the cusp of the moving Now, or the point at which branches fall off, etc.
- The present in all these theories is not something that can be read off from the set of all temporal relations in the world. The present is ontologically special, something extra not captured by physical theory. Tensers often speak of absolute fundamental monadic properties of presentness, pastness and futurity.
- C D Broad, Arthur Prior, E J Lowe...


Arthur Prior
1914–1969


Time
Your death
Today's
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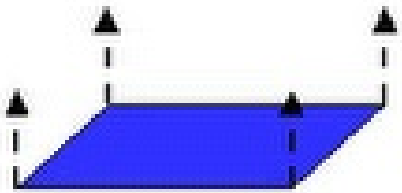
Past
Your birth

Presentism

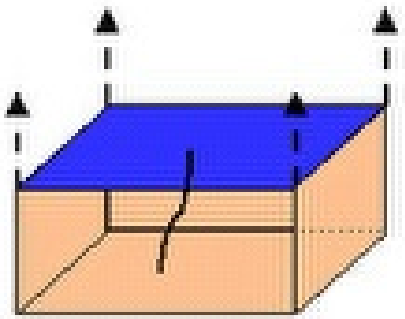
3 METAPHYSICS OF TIME

Presentism
"Nowism"



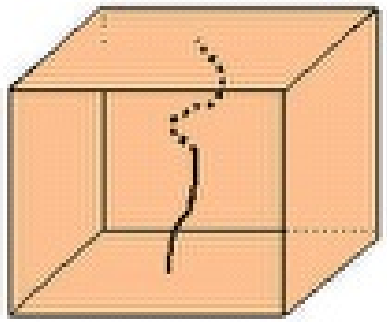
The Present

Possibilism
"The Tree Model"



Past & Present

Eternalism
"The Block Universe"



Past, Present, & Future

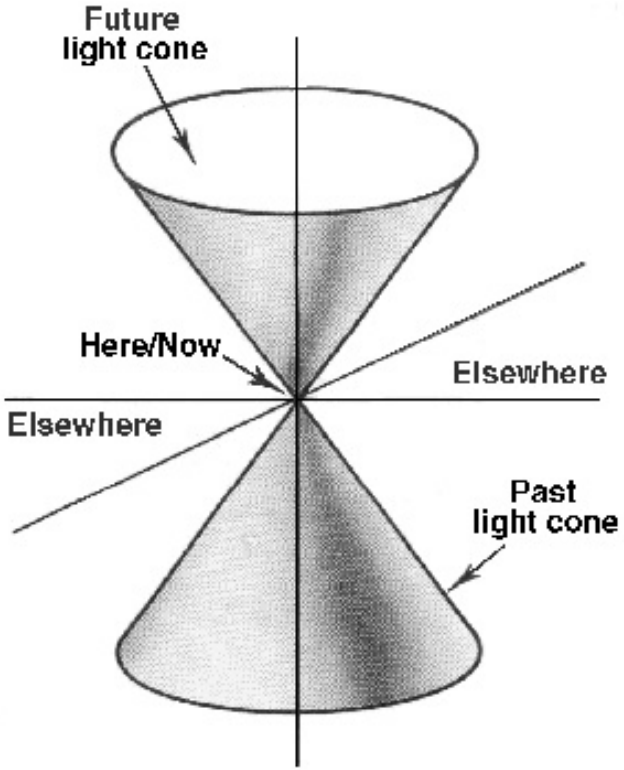
Position (Presentism)

Presentism maintains that only present events and objects exist. Furthermore, it is usually assumed that there is a succession of presents, i.e. a moving Now.

Presentists must face two challenges:

1. How long is the present? It is instantaneous or finite but brief?
2. The problem of the past: by virtue of what are propositions on past events true?

Objections to tensed theories



1. McTaggart's Paradox
2. Smart/Broad's 'how fast...?'
3. Special Relativity 'No-go' theorem
4. Epistemic

(1) John McTaggart Ellis McTaggart (1866-1925)

- John McTaggart Ellis *McTaggart*
- educated and taught at Cambridge
- man of contradictions: started out as radical, became increasingly conservative (was instrumental in Russell's expulsion from Trinity College during WWI), yet advocated women's suffrage, was an atheist, yet firm believer in human immortality and staunch defender of Church of England...
- British idealism, influenced by Hegel
- 'The unreality of time', *Mind* **17** (1908): 456-473.

McTaggart's master argument

1. If there is time, it must be tensed time (because only tensed time makes sense of change).
2. But time is not tensed (because that leads to contradiction).

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3. Hence, time does not exist.

Establishing the first premise

1. Real change requires temporal becoming
2. Temporal becoming requires the tensed theory of time (i.e., changing monadic properties of time—pastness, etc.)
3. Real change exists

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4. Time is tensed

Establishing the second premise

Tensed theory is incoherent:

1. Past, present and future are incompatible properties.

   Why? Well, if an event is past it can't be present.

2. But every event has all three of these properties, e.g., Socrates's death was once future, then present and is now past.

Claims 1 and 2 are both true according to the tensed theory, but they are logically incompatible.

Formally...

1. If event e is future, then it is not past, i.e,. $Fe \rightarrow \neg Pe$.
2. But for all e, Fe, Ne, Pe.
3. From 2, Fe.
4. From 2, Pe.
5. From 1 and 3, $\neg Pe$.
6. From 4, 5, Pe & $\neg Pe$—contradiction!

Natural reply

- 2 is not true! Events aren't simultaneously past present and future... that's stupid!
- McTaggart: HA! What do you mean when you say that?
- One possibility: in 2014 CE Socrates's death is past, in 3000 BCE it's future...
- But that's a tenseless B-relation! You've extracted yourself from the paradox by adopting your opponent's theory!

Or stick tensed...

- In the past, this lecture is future; in the Now it's present; in the future it's past...
- McTaggart: rerun my argument

$$\{PPe, FFe, NNe, PNe, FNe, NFe, PFe, FPe, NPe\}$$

Every e must have each of these, yet they're incompatible: e.g., $NNe \rightarrow \neg PNe$.

Reply: no, not simultaneously *NNe* and *PNe*!

Reply: Rerun with *NNNe* and *NPNe*...

Reply: no, not simultaneously *NNNe* and *NPNe*!

Reply: I'm getting tired... it's an infinite regress

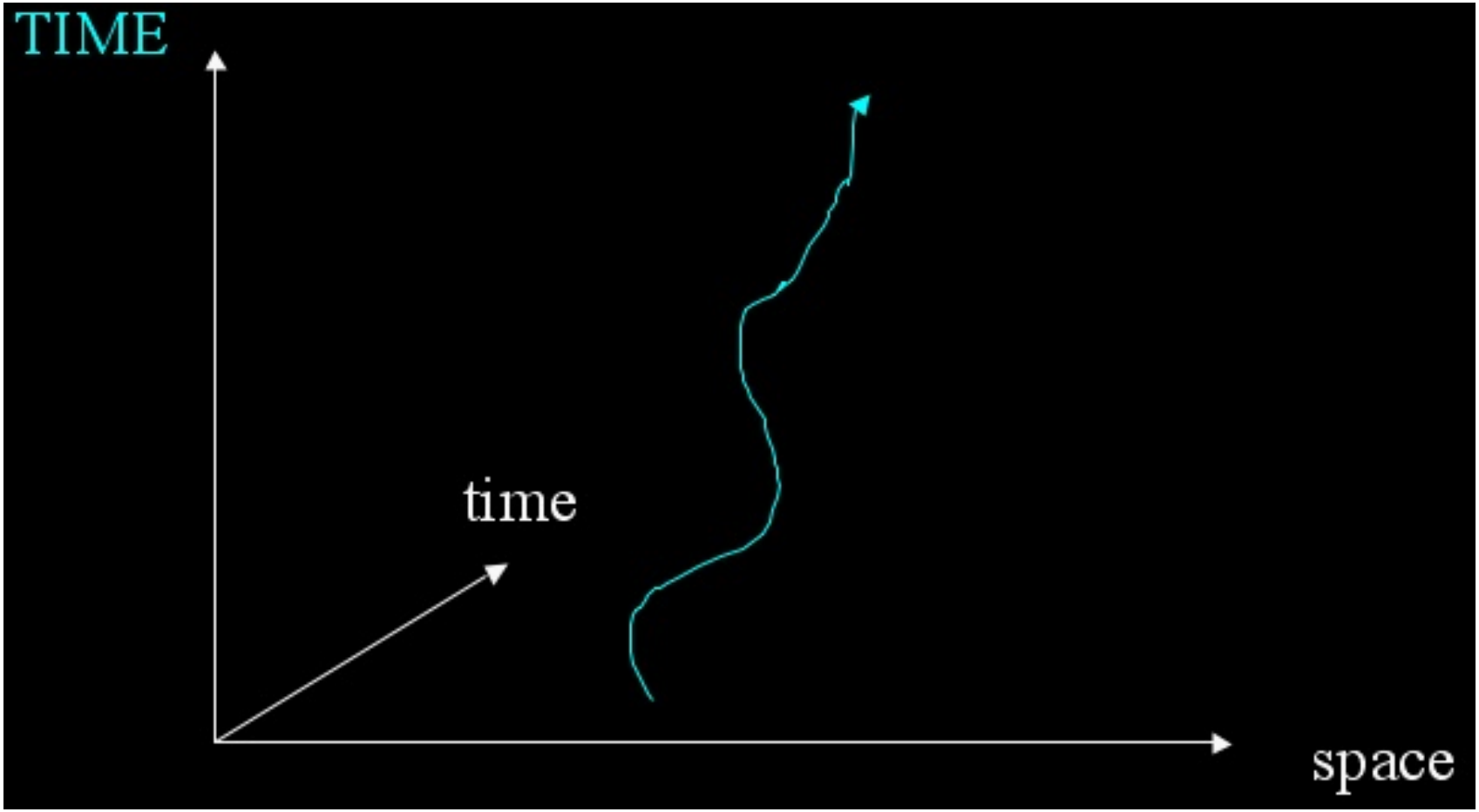
Reply: not all infinite regresses are bad

Reply: they ain't all good either...

(2) How fast does time fly?

J.J.C. Smart:

> *"If time flows... this would be a motion with respect to a hypertime. For motion in space is motion with respect to time, and motion of time or in time could hardly be a motion in time with respect to time... If motion in space is feet per second, at what speed is the flow of time? Seconds per what? Moreover, if passage is the essence of time, it is presumably the essence of hypertime, too which would lead us to postulate a hyper-hypertime and so on ad infinitum."*


TIME
time
space

Replies

- 1sec/1sec
- 1sec/1SEC and 1SEC/1sec
- Accept infinity
- Flow is metaphorical
- Ditch passage

(4) Epistemic Objection (Williams, Price)

Huw Price:

> *"How would things seem if time didn't flow? If we suppose for the moment that there is an objective flow of time, we seem to be able to imagine a world which would be just like ours, except that it would be a four-dimensional block universe rather than a three-dimensional one. It is easy to see how to map events-at-times in the dynamic universe onto events-at-temporal locations in the block universe. Among other things, our individual mental states get mapped over, moment by moment. But then surely our copies in the block universe would have the same experiences we do... Things would seem this way, even if we ourselves were elements of a block universe"*

- Williams's idea is that the flow or whoosh is extra. Occam's razor would cut it away.
- Does this argument beg the question?

Arguments for Tenses

1. Temporal 'Knowledge' Argument:

   (i) My lecture is now.
   (ii) My lecture is on XX March 20XX, XX:XXam/pm (plug in exact date and time)

   I can know (i) without (ii), and vice versa. Think of the spatial versions of each... Compare with Mary argument and qualia.

2. Experience
   - privileged present
   - asymmetry of past and future: headache argument
   - becoming

Arthur Prior's "Thank goodness that's over"

- How much would you pay to relieve you from present pain? From future pain? From past pain?
- Lucretius: why are we concerned with our future-finite existence, but not with our past-finite one?
- Prior (1959): after a fierce headache, we exclaim: "Thank goodness that's over!" What are we expressing relief about?
- it seems as if we're thanking goodness for a tensed fact, something that wasn't a fact until the headache subsided

$\Rightarrow$ Prior: there must be tenses

How Might Detensers Respond?

- Temporal asymmetry:
  - Radiation asymmetry
  - Thermodynamic asymmetry
  - Memory asymmetry
  - Etc

  Imply the behavioral asymmetry
- Specialness of the Present:

  Explain why we might be tempted to posit a global objective present even when there isn't one, really. Use various facts about the world to do so.

  (Everything that follows is not testable.)

Goerz Tenax 6×9, before 1926