

Title: What is Shape Dynamics?

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Abstract:

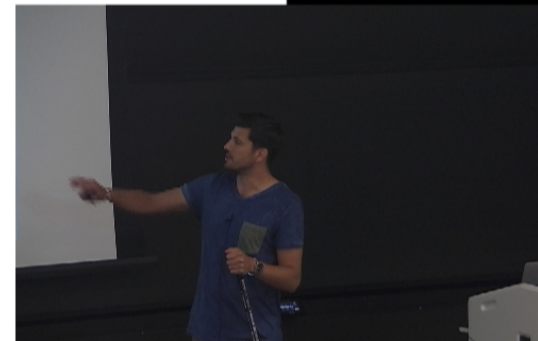
## What is Shape Dynamics?

### Firstly

Shape Dynamics is a theory of gravity where local (spatial) scale is relative and simultaneity is fixed. It is locally — but not always globally — equivalent to GR.

### But also,

An ambition to describe the quantum physics of gravitation in completely scale-invariant, relational terms.



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⇒ ontological shift from a spacetime picture to a picture of evolving conformal geometry.

In a word...

... Shape Dynamics is the world one shape after another.



## Motivation

Why  $g_{ab}^{(3)} \rightarrow e^{\phi(x)} g_{ab}^{(3)}$ ?





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- Clean observable/evolution split.
- Quantum Field Theory  $\Rightarrow$  new theory space.



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- Clean observable/evolution split.
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- The hell of it...



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## Shape Dynamics Take Home Message

### Old Observation (1970s)

- Fix foliation (CMC)  $\Rightarrow$  initial data is conformal
- York '72:  
"An increasing amount of evidence shows that the true dynamical degrees of freedom of the gravitational field can be identified directly with the conformally invariant geometry of three-dimensional spacelike hypersurfaces embedded in spacetime."



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- Duality  $\Rightarrow$  conformal gauge of Shape Dynamics equal to a foliation of GR.



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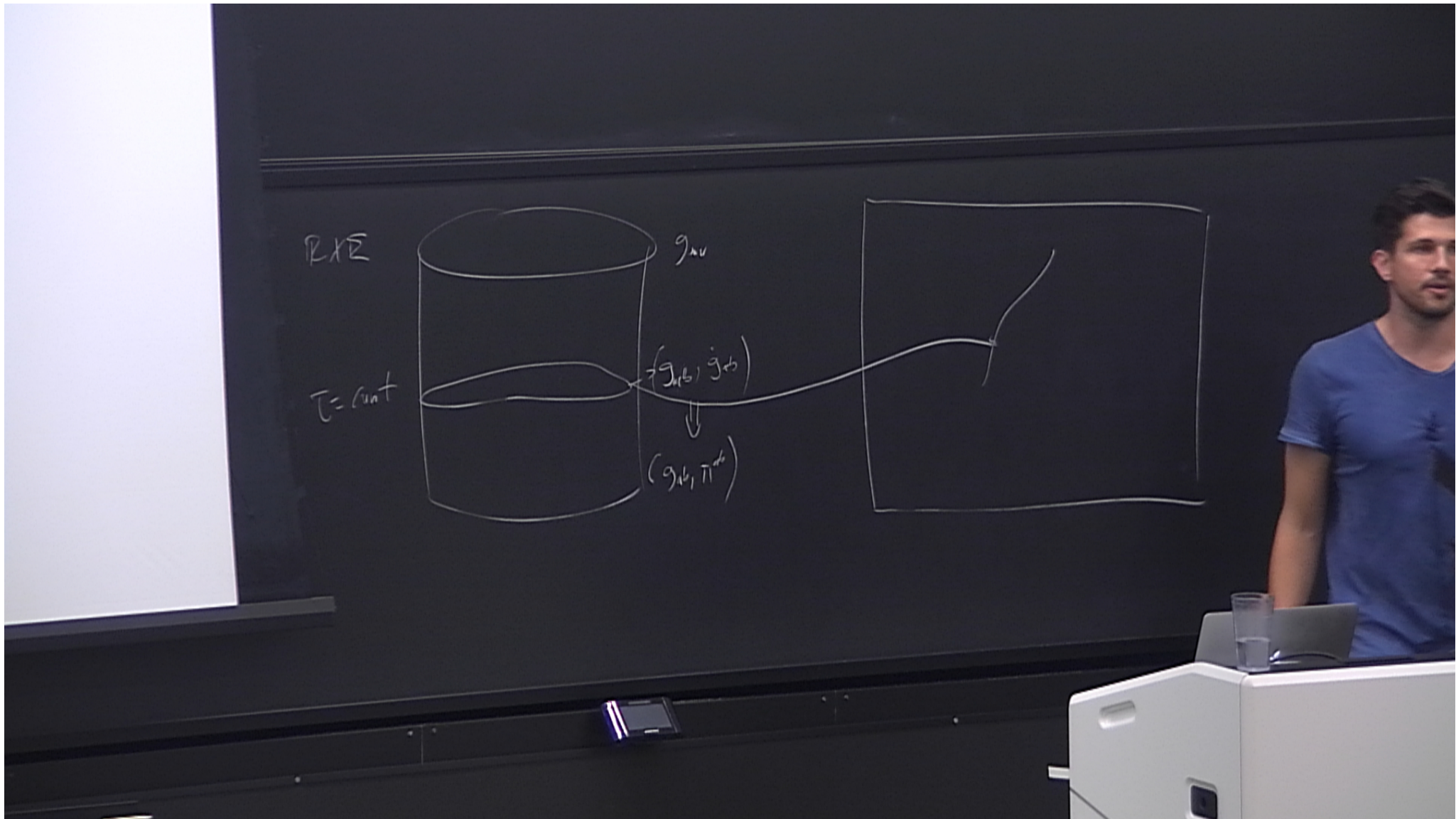
### Global Differences:

- Physically different classical solutions (black holes, cosmological toy models,...).



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## Iconic Diagram

