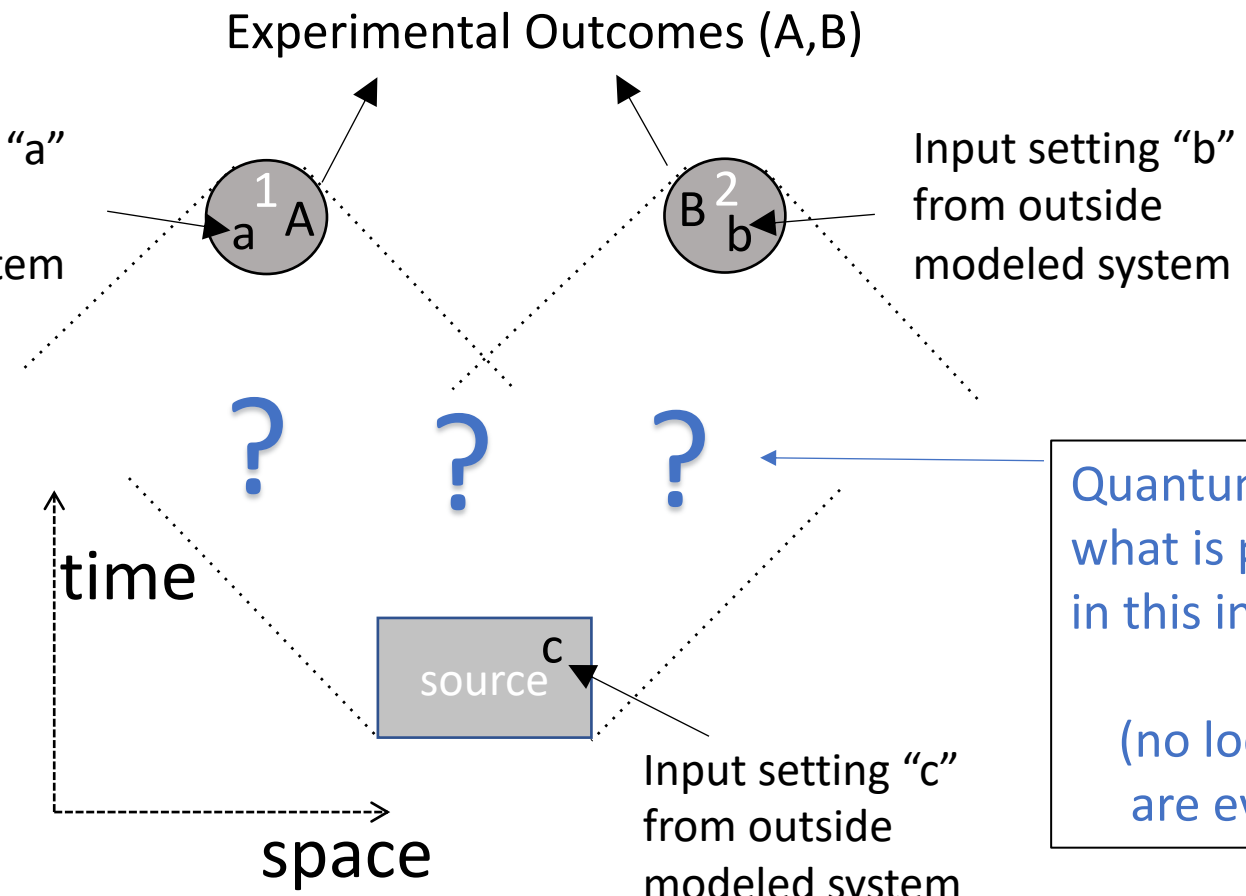
SLIDE #1

Spacetime Geometry of Entanglement Experiments

Quantum Theory is a model which yields correlated probabilities $P_{a,b,c}(A,B)$



Based on: "Bell's theorem and locally mediated reformulations of quantum mechanics", K.B. Wharton and N. Argaman, **Rev. Mod. Phys. v**92, 21002 (2020). arXiv.org/abs/1906.04313

Quantum theory says nothing about what is physically happening in this intermediate region.

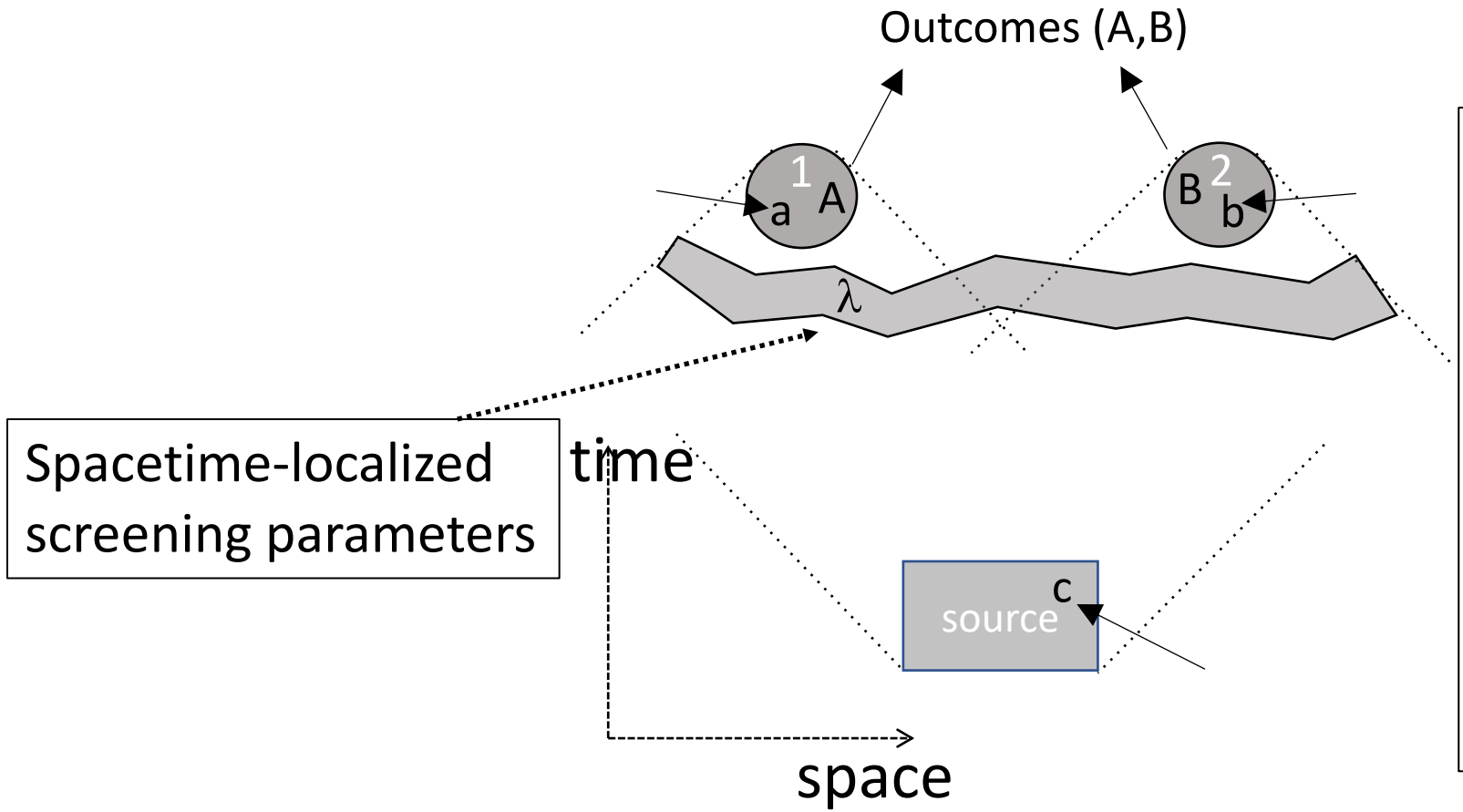
(no localized theory parameters are even assigned to this region!)

SLIDE
#2

Bell's Theorem:

There is no "local" and "causal" model $P_{a,b,c}(A, B, \lambda)$ in agreement with QM.

(This is true even if λ doesn't exist at all!)



The only way to save locality:

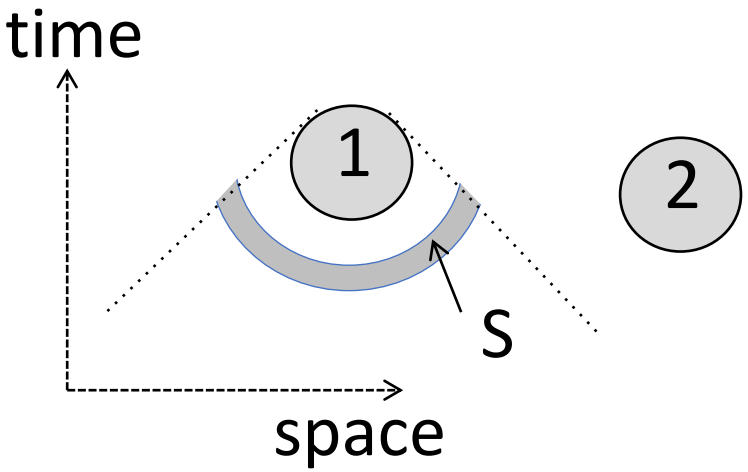
Hidden parameters λ must depend on future inputs (a,b).

Such models are accurately termed "retrocausal"

(not "superdeterministic")

SLIDE #3

Bell's definition of "locality"



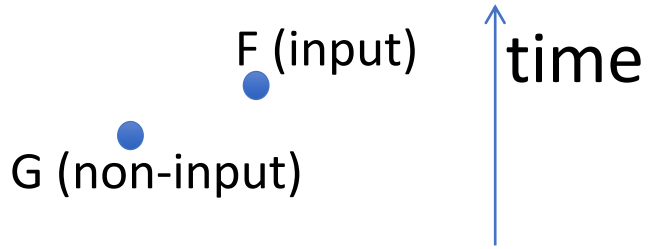
When predicting parameters in "1", parameters in "2" are REDUNDANT, given parameters in "S".

$$P_{I_1,I_2}(Q_1) \mid given\ (Q_2, Q_S)$$
$$= P_{I_1}(Q_1) \mid given\ only\ (Q_S)$$

Q_1 = non-input parameters calculated/computed by a model in region 1, etc.

Equations needed for proof of Bell's Theorem.

Model-based "causality"



When modeling any parameter "G", all input parameters which enter the model after G are always irrelevant.

$$P_{I,F}(G) = P_I(G)$$

For all inputs F in the future of G