SUSY and the Holographic Screens

SUSY at the Heart of Only Well Defined Theory of QG

Does It Have a Deeper Geometrical Meaning?

TB at Mill. Conf.: Related to Holography?

AF Holography: Screen Involves Choice of Light Cone Gauge

Bousso: Broad Ambiguity in Choice of Screens in General Space-Time

Interpret as a New Gauge Invariance
Should Show Up in Effective Theory
What Could it Be But Local SUSY?

The Geometrical Meaning of Spinors

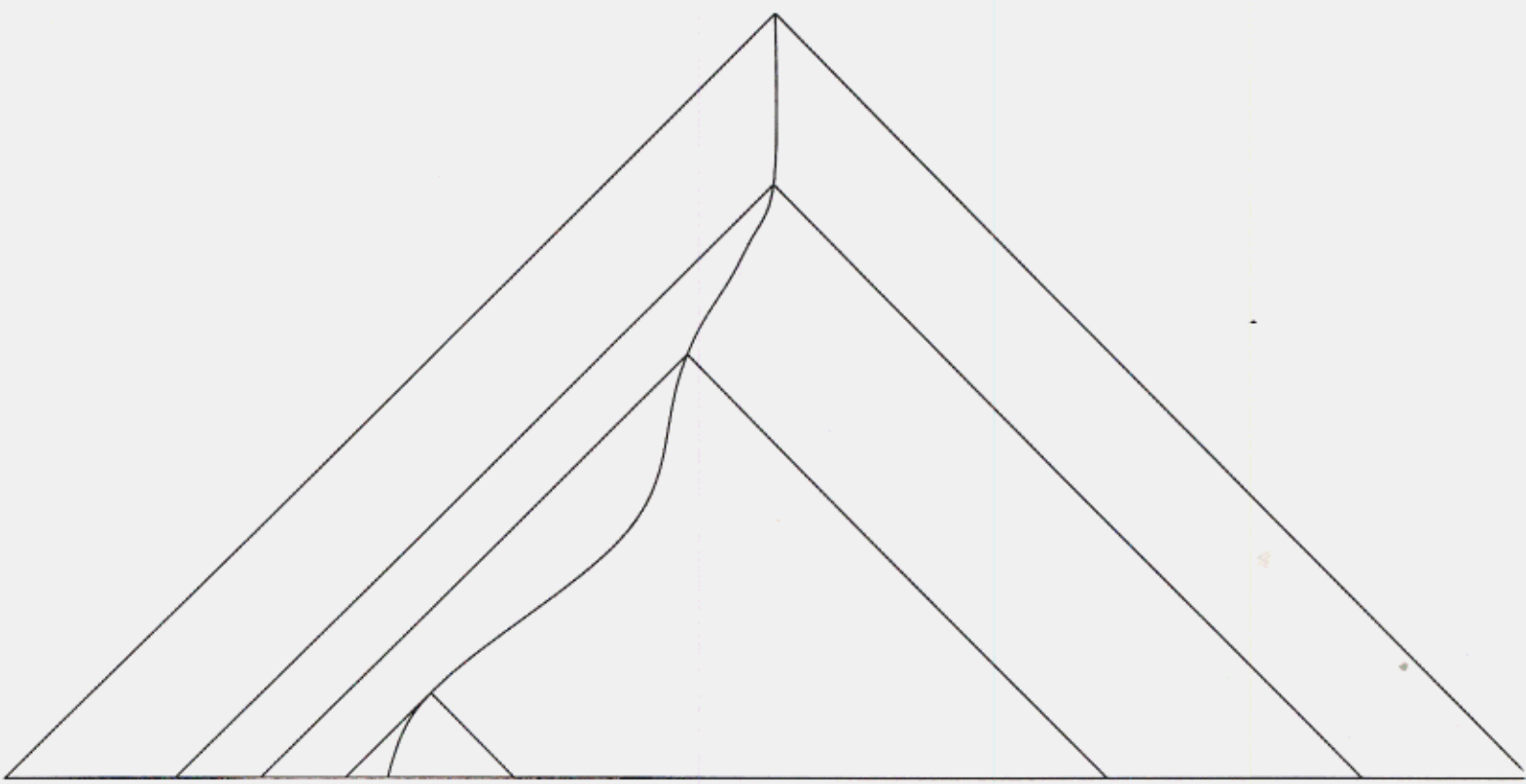
Cartan: Pure Spinors Have A Geometrical (Projective) Interpretation
In Terms of Null Hyperplanes
Basis of Penrose Twistor Ideas

Purity: $\bar{\psi}\gamma^{\mu}\psi\gamma_{\mu}\psi = 0$

Non-zero Components of $\bar{\psi}\gamma^{\mu_1\cdots\mu_k}\psi$ $2 \leq k \leq d$
Define Null $(d-2)$ Plane
$\bar{\psi}\gamma^{\mu}\psi$, Null Direction
Penrose (4d): Flagpole Plus Flag

Physical Interpretation: Choice of Spinor at A Point
Is Choice of Direction and Orientation of Holoscreen
For Data at That Point

Project Inv. of CP Eqn. $\psi \to \lambda\psi$ $\lambda \in \mathbf{C}$ or $\mathbf{R}$
Metrical Notions Like Distance to or Size of Screen
Not Defined
Will Be Defined in Quantum Theory



Holographic Cosmology

FSB Entropy Bound Implies(?) Operator Algebra
Describing Measurements in Interior of Backward L.C.
In Big Bang Cosmology, Is Finite Dim.

Derivation of Concept of Particle Horizon Independent
Of Local Field Theory

$$\mathcal{H}_t = \mathcal{K} \otimes \mathcal{H}_{t-1}$$

Relation of Hilbert Spaces at Consecutive Points
Along a Timelike Trajectory
Time Step Changes W/Time: Equal BHFSB Area Steps

$$U_k^{(t)} \; 1 \leq k \leq t-1 \text{ in } \mathcal{H}_n$$
$$U_k^{(t)} = U_k^{(p)} \otimes V_k^{(t,p)} \; p \leq t$$

Choose $\mathcal{K}$ to Be Irrep of $[\hat{S}_a, \hat{S}_b]_+ = \delta_{ab}$
When Minimal $SO(d-2)$ Spinor Real
Implicit Choice of Local Lorentz Gauge

Interpret $\hat{S}_a(t)$ As New Bit of Screen

On Which Data in $\mathcal{K}$ Projected

In Simplest Theory, This is Only Dynamical Variable

Screen Area Quantized: BHFSB

Quantization Breaks Real Proj. Inv. to Z_2

$$S_a(n) \equiv (-1)^F_{t-1} \hat{S}_a$$

Fermi Statistics

Non-compact 11 D Cosmology

Introduce Hypercubic 11D Lattice $t, \mathbf{x}$

Previous Structure On Lines of Fixed $\mathbf{x}$

Map Between Nearest Neighbor Op. Algebras

$S_a(t, \mathbf{x}) = \Psi_{ab}(t, \mathbf{x}; t', \mathbf{x} + \mathbf{e}) S_b(t', \mathbf{x} + \mathbf{e})$ $t' \leq t$.

Defines Path Dependent Spinors $S_a^\Gamma(t, \mathbf{x}; t', \mathbf{x}')$: Gravitino Field

Rank Ψ is 256^{t-1}

Complicated Consistency Conditions

Between Ψ and Time Evolution

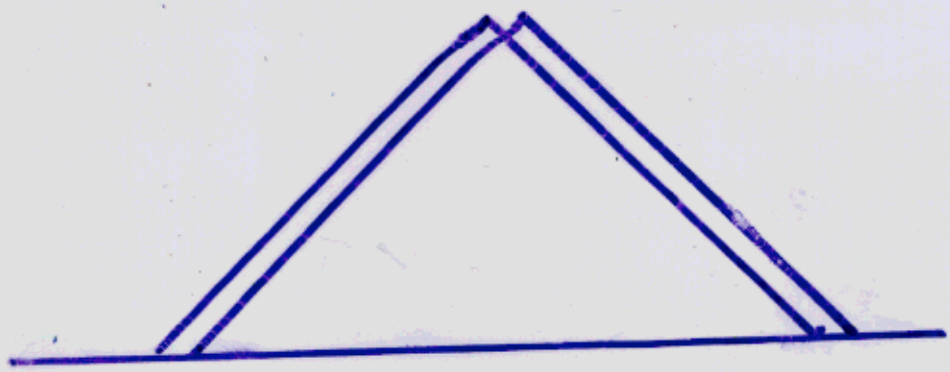
No Known Solutions

When Are Two Solutions "Equivalent"?

Expect Two FRW Cosmologies in 11D

$p = w\rho \quad w = (1, \frac{1}{10})$

TB and Fischler: Guess For $w = 1$ In Terms of Random Matrices



Asymptotically Infinite Maximally Symmetric Spaces

Algebras Corresponding to Nested Causal Diamonds

Finite for AF, Finite Jumping to ∞ in AAdS

AF: Build In TCP, Add Both Past And Future Directed Spinor

Build in $SO(d-1)$, Take $S_a^{\pm}(\Omega)$ Sections

Of Spinor Bundle on Fuzzy $d-2$ Sphere

Ramgoolam: $x^a = \sum \gamma^a$

Radius Determined by BHFSB Area

Take Limit Which Is Conformally Invariant on $SO(d-2)$

$\rightarrow$ Lorentz Invariance

$Q_{\alpha}^{\pm} = lim(\phi_{\alpha}^{a})^{T} S_a^{\pm} \rightarrow \int d\Omega \phi_{alpha}^{a}(\Omega) S_a^{\pm}(\Omega)$

ϕ_{α}^{a} Conformal Killing Spinors

Awada, Gibbons, Shaw

Dynamics: $S_a^{+}(t) = U(t,-t) S_a^{-}(t)$

U Restricted by Consistency on Lattice As Before

Hope: This Plus Conformal Invariance Gives

Unique Family of $\mathcal{S} \equiv lim_{t \rightarrow \infty} U(t,-t)$