

WHY DO WE DO PHYSICS?

by  
2015-

BECAUSE PHYSICS IS FUN!!

1. Name dropping
2. Heros, mentors, colleagues
3. Scooped
4. Temporal gauge
5. Broken & dull
6. Up the mountain & down
7. Too few skew nuts
8. Expletive deleted
9. Out to pasture (I)
10. DC politics
11. FAD & Dec
12. Sandbagged
13. Out to pasture (II)
14. Darkness
- 15.

# BIG NAMES

YES:

Pauli

Oppenheimer

Sakharov

Heisenberg

Teller

Zeldovich

Dirac

Kapitsa

Bohr

Einstein

NO:

Fermi

Landau

HEROES

Weisskopf

Panofsky

Robert R. Wilson

Lederman

Richter

MENTORS

Hans Mueller

Francis Friedman

SIDNEY DRELL

Fred Zachariassen

Jack Kuffel

DEEPLY INVESTIGATIVE COLLEAGUES

Jerry Friedman

Richard Taylor

Henry Kendall

Hobey de Staebler

David Coward

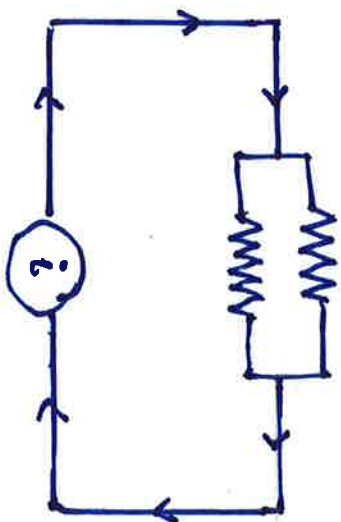
# SCOOPED !!

1950's  
Buzzwords

Analyticity  
Unitarity  
Causality

Dispersion Relations  
S-Matrix Theory  
Regge Trajectories

with  $\mathcal{O}(n)$   $\Leftrightarrow$



# TEMPORAL GAUGE

Nambu

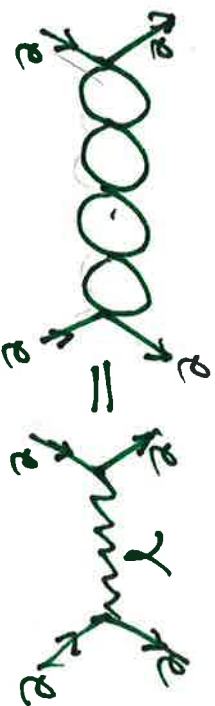
"Gap Equation"



BT



"Goldstone boson"



Temporal  
gauge

$$A_0 = 0 \quad \vec{A} = \int_{-\infty}^t dt' \vec{E}(x, t')$$

Fallout (Big Names)

BROKEN ≠ DULL

Translation: Broken ≠ Dull

# UP THE MOUNTAIN AND DOWN

People

Murray Gell-Mann: Current Algebra

Adler  
Fubini... } Sum Rules

by Feynman } Contents of the Sum

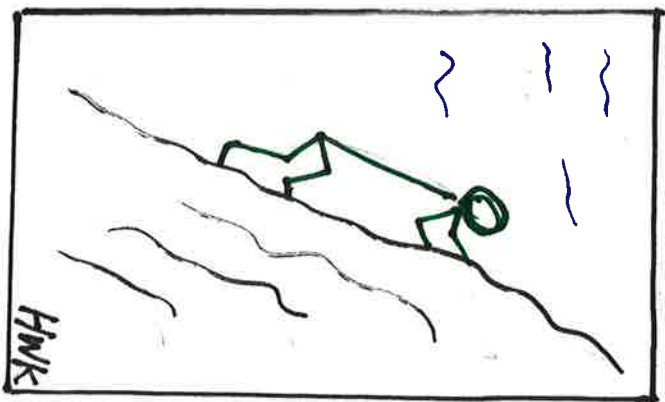
TEM }

Quarks  
Quantum Field Theory

Language

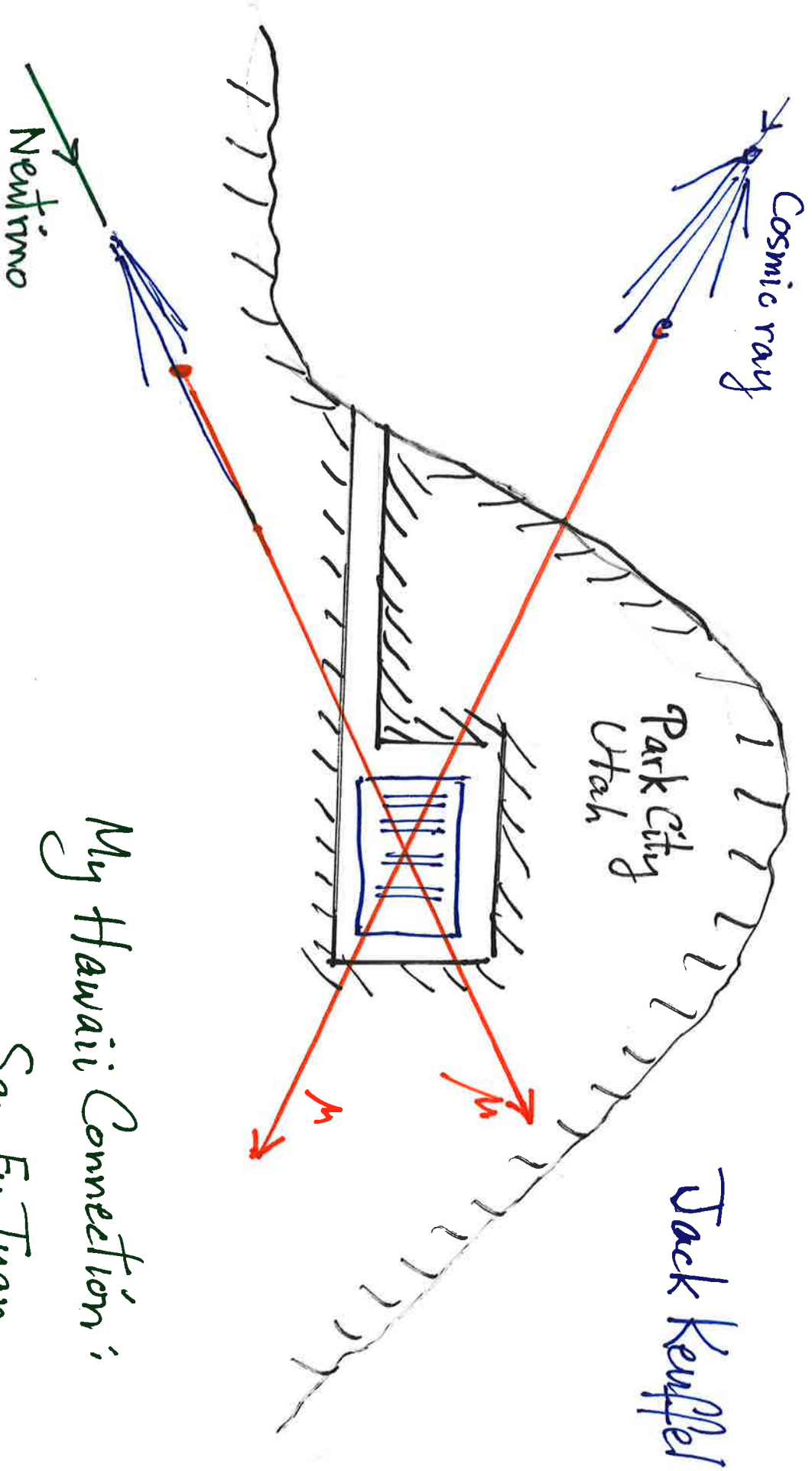
Analyticity  
Unitarity  
Dispersion Relations  
Nuclear Democracy  
Bootstrap

⋮  
Quarks & quons  
Parton Distributions  
Asymptotic Freedom  
QCD



Bjorken  
Scaling

# Too Few Skew Mu's



My Hawaii Connection:

- San Fu Tuan
- Sandip Pakvasa
- Walter Simmons



# EXPLETIVE DELETED

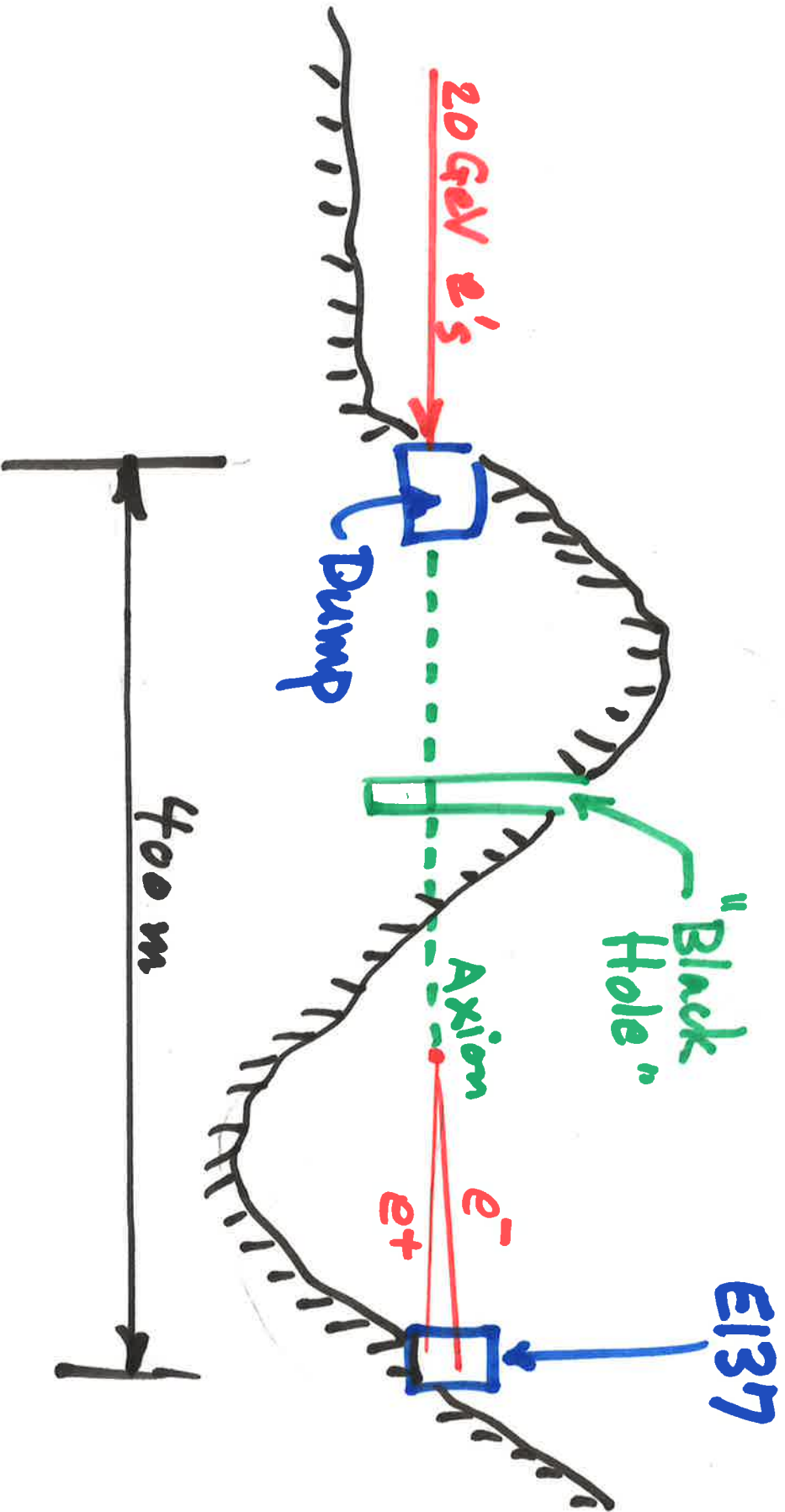
November 1974: The Y is discovered at SLAC

OH, \*\*\*\*\* !!

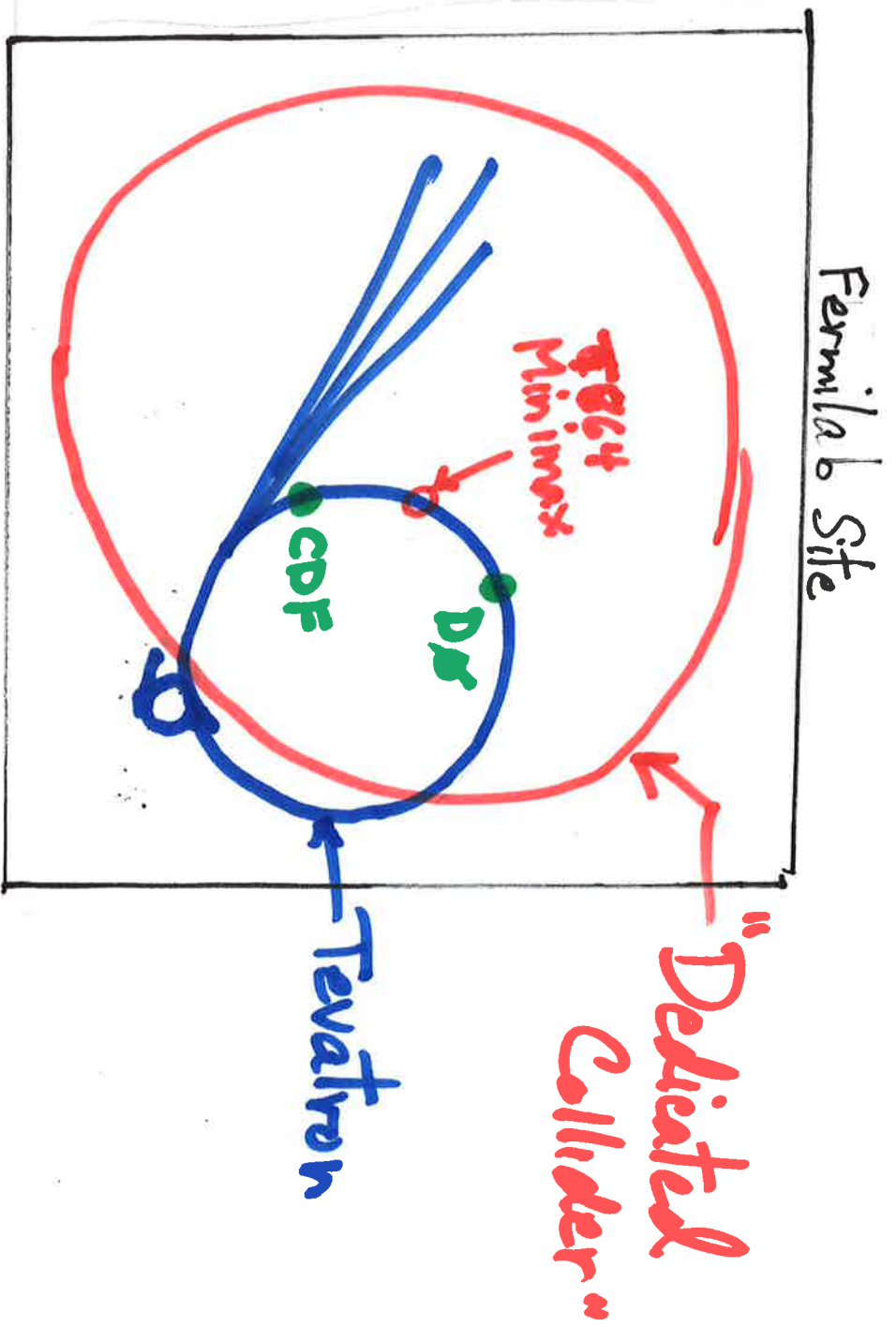
The memo to Burf Richter

(by Helen Quinn)

# OUT TO PASTURE (I)

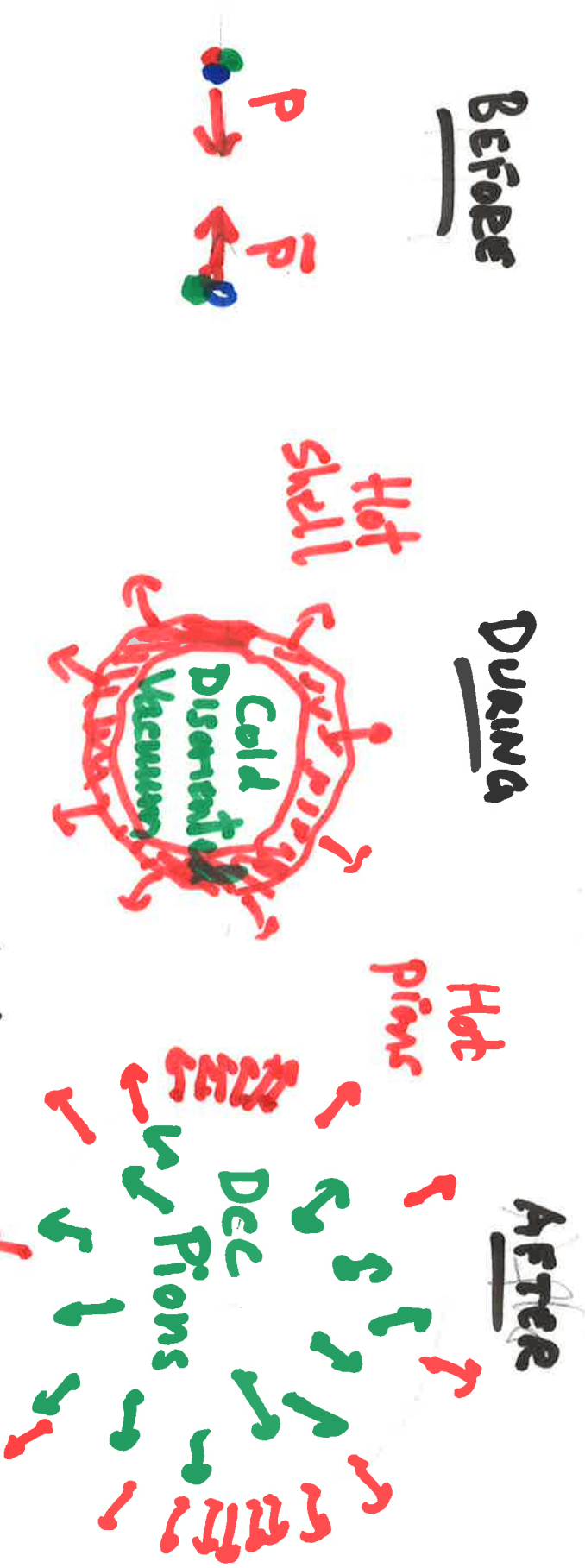


# DC POLITICS



FAD: Full Acceptance Detector for the SSC

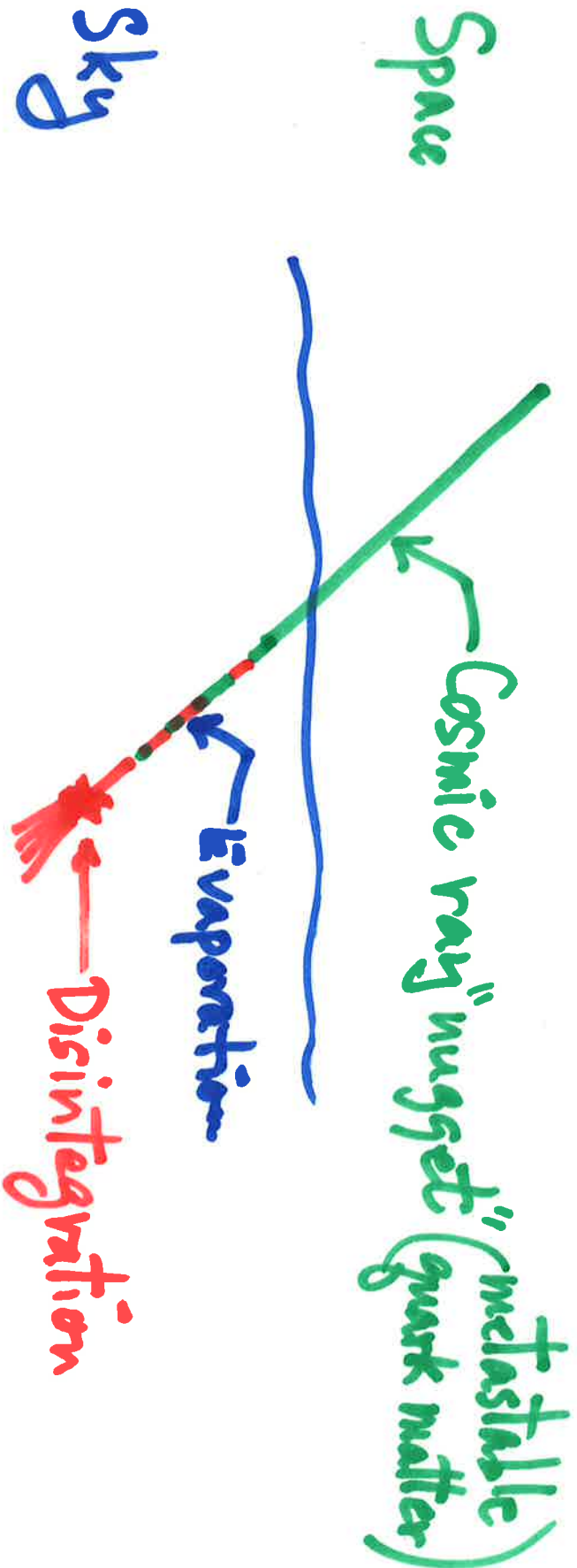
DCC: Disoriented Chiral Condensate



Minimax (T864): Experimental Search for DCC

12/16

# SANDBAGGED



Terra  
firma  
(Larry Melerman + bj)

# OUT TO PASTURE (II)

1998: I retire

1999-2015: Physics is still fun

GR

Cosmology

Dark energy !

# DARKNESS

The problem: what is dark energy?

The descriptive language (Lagrangians)

Einstein-Hilbert:  $\frac{1}{2g} \sqrt{g} (R + \Lambda)$

Einstein-Cartan:  $\frac{1}{g} (e e R + \Lambda e e e e)$

MacDowell-Mansouri:

$$\frac{1}{g_N} F F \Rightarrow \frac{1}{g_N} (R R + \Lambda e e R + \Lambda^2 e e e e)$$

$$\rightarrow \frac{1}{g_N} R R \equiv 2\pi \frac{dN}{dH}$$

When Dark Energy dominates

$$N_N \sim 10^{38} \text{ cm}^3 \quad \frac{E}{V} \sim 10^4 \text{ eV/cm}^3$$

DARKNESS

# GETTING SERIOUS

It's Different Now.

BEFORE

- Tenure-track jobs were plentiful

- Curiosity-driven research was generously supported

- There was very little micro management

NOW

Not so