Remembering Ann Nelson

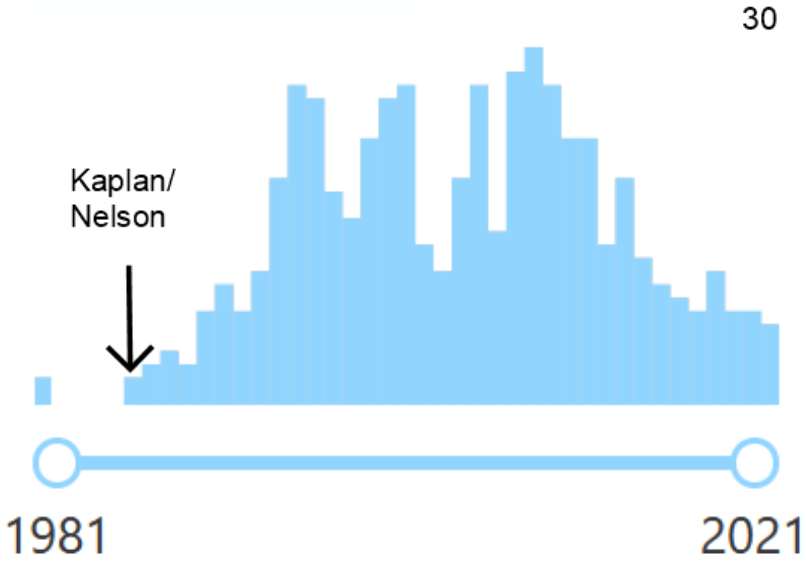
Howard Georgi

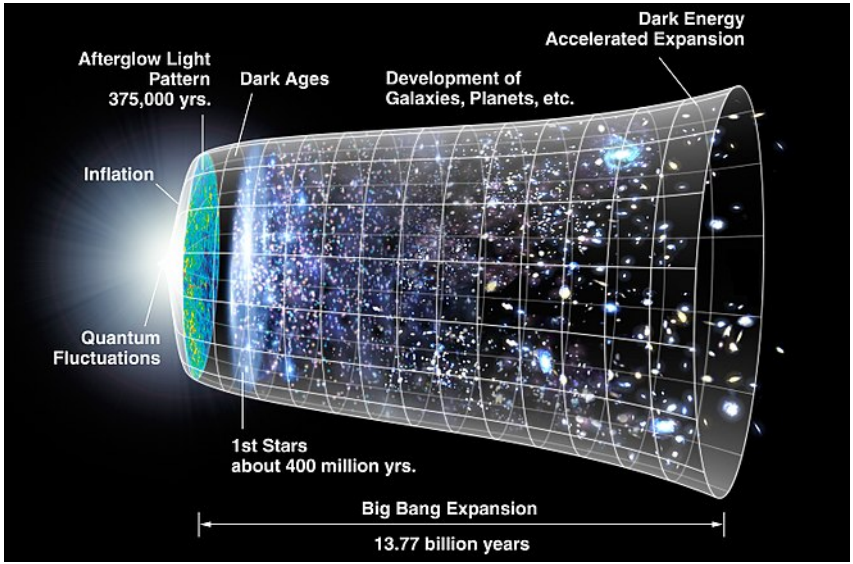

Coors

Chanda Prescod-Weinstein:

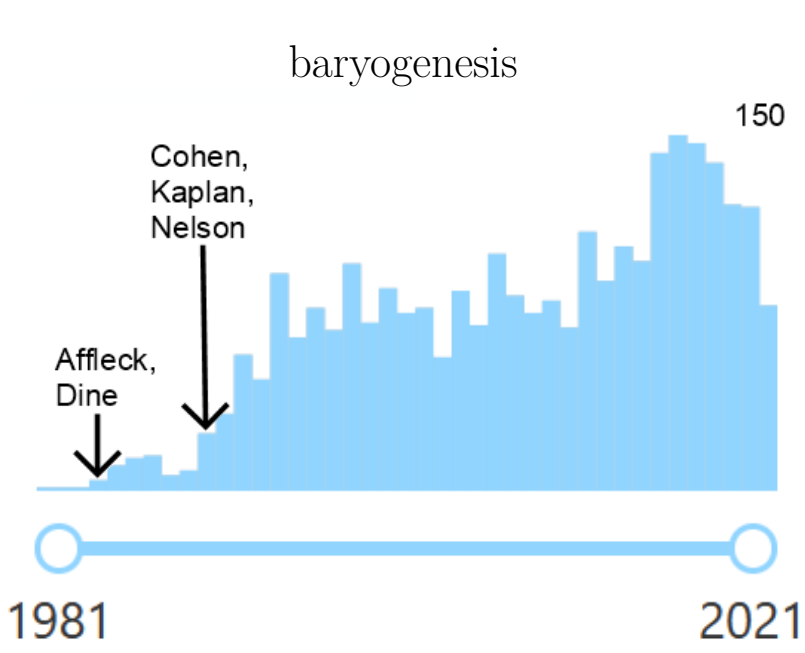
Ann told me that to be happy as a model builder in particle physics, I had to be OK with something like mounting a moose head on the wall and putting a purple scarf on it and not worrying about why it was wearing a purple scarf.

kaon condensation

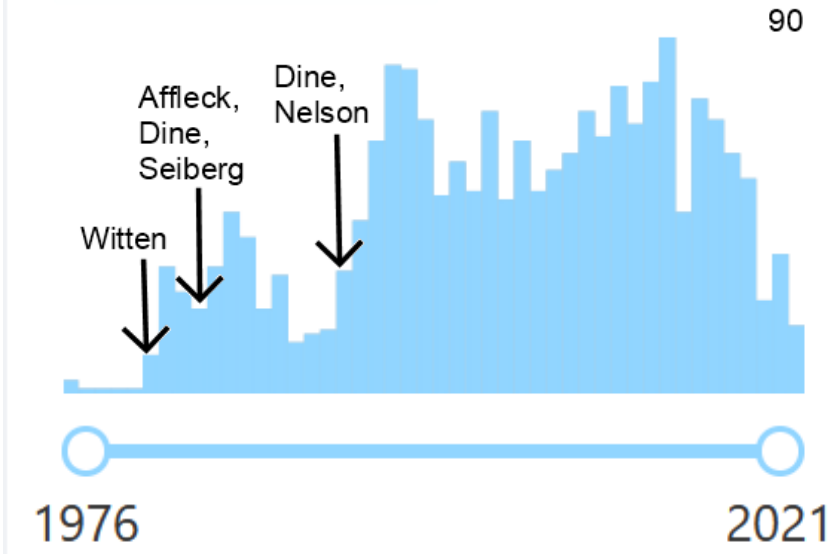



Dark Energy
Accelerated Expansion
Afterglow Light
Pattern
375,000 yrs.
Dark Ages
Development of
Galaxies, Planets, etc.
Inflation
Quantum
Fluctuations
1st Stars
about 400 million yrs.
Big Bang Expansion
13.77 billion years

Wikipedia


baryogenesis
150
Cohen,
Kaplan,
Nelson
Affleck,
Dine
1981
2021

low energy supersymmetry breaking



$$SU(7) \times SU(2) \times SU(3)_L \times SU(3)_R \times SU(7)_G$$

$$Q = (7, 1, \bar{3}, 1, 1) \quad \bar{Q} = (\bar{7}, 1, 1, 3, 1)$$

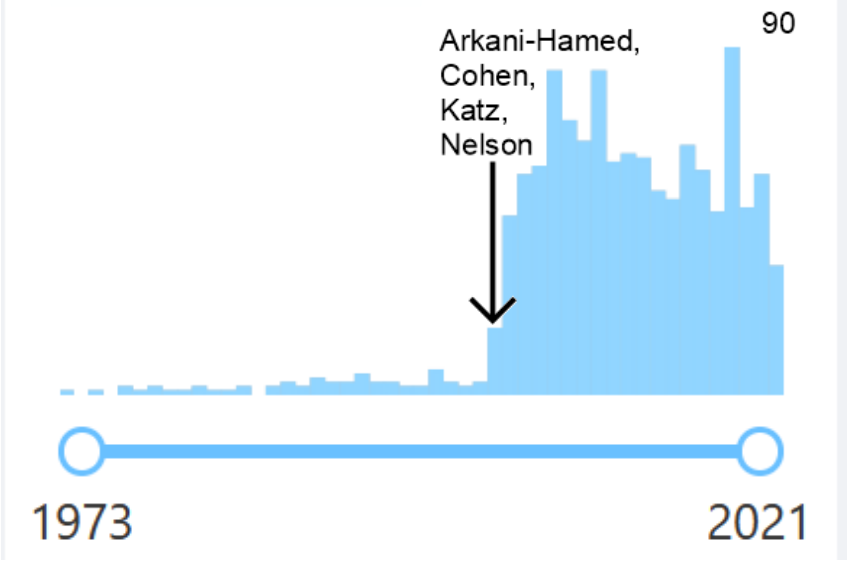
$$q = (7, 2, 1, 1, 1) \quad \bar{u} = (\bar{7}, 1, 1, 1, 1) \quad \bar{d} = (\bar{7}, 1, 1, 1, 1)$$

$$X = (1, 1, \bar{3}, 3, 1) \quad \bar{X} = (1, 1, 3, \bar{3}, 1)$$

$$f = (1, 1, 3, 1, 7) \quad \bar{f} = (1, 1, \bar{3}, 1, \bar{7}) \quad \ell = (1, 2, 1, 1, 1)$$

$SU(7) \times SU(2)$ is supercolor that breaks SUSY in a hidden sector
$SU(7)_G$ contains $SU(3) \times SU(2) \times U(1)$
supercolor theory has a local minimum with broken SUSY and
$SU(3)_L \times SU(3)_R$ combines with an $SU(3)$ subgoup of $SU(7)$, leaving an unbroken R-color $SU(3)$ that gets strong and communicates SUSY breaking to the standard model $SU(3) \times SU(2) \times U(1)$

Little Higgs



two approximate symmetries, G_1 and G_2

$$\mathcal{L}_0 + \mathcal{L}_1 + \mathcal{L}_2 \tag{1}$$

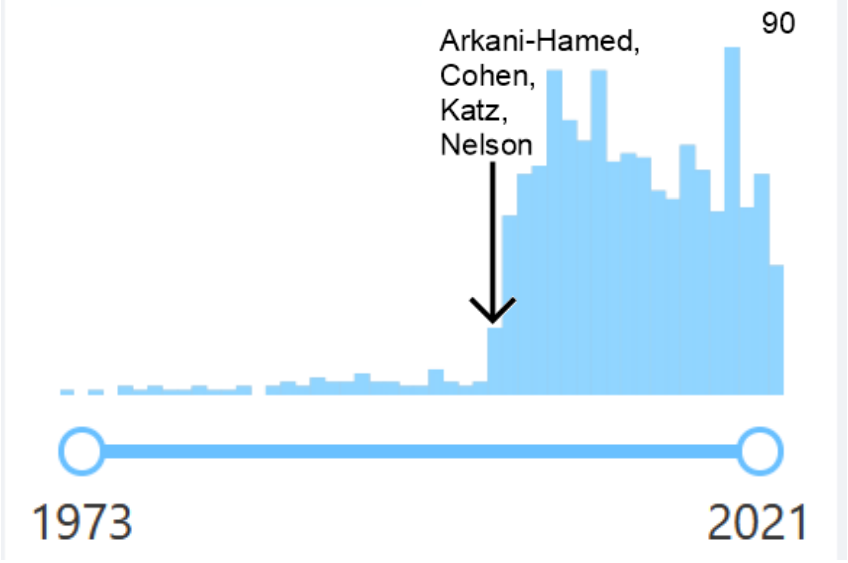
$\mathcal{L}_0$ is the chiral Lagrangian describing a set of Goldstone bosons, including what will become the Higgs multiplet

$\mathcal{L}_1$ preserves G_1 and breaks G_2

$\mathcal{L}_2$ preserves G_2 and breaks G_1

if G_1 and G_2 each preserve the Goldstone nature of the Higgs, it will remain massless at 1-loop

Little Higgs



Composite Higgs Models with a Hidden Sector

Ann E. Nelson(Washington U., Seattle), Michael Park(Washington U., Seattle), Devin G.E. Walker(Dartmouth Coll.) (Sep 25, 2018)

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"Despite its success in discovering a Standard Model-like Higgs boson, the Large Hadron Collider (LHC) has yet to provide a satisfying explanation for the mechanism of electroweak symmetry breaking (EWSB). To date there is no discovery leading the way to new physics, and many of the popular explanatory frameworks are becoming constrained into finely tuned regions of their parameter spaces. Theoretical development over the last several decades has largely been motivated by criteria of *naturalness* and *parsimony* [1]. While there is a strong logical and historical motivation for this notion of naturalness, there is also an arguably comparable motivation for cautious **skepticism** in our conceptions about parsimony."

Diversity - citizenship

CP, flavor, compositeness

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