Remembering Ann Nelson

Howard Georgi
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
Wikipedia
baryogenesis
low energy supersymmetry breaking
\[ SU(7) \times SU(2) \times SU(3)_L \times SU(3)_R \times SU(7)_G \]

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

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

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

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

\(SU(7) \times SU(2)\) 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

Arkani-Hamed, Cohen, Katz, Nelson

1973

2021
two approximate symmetries, $G_1$ and $G_2$

$$\mathcal{L}_0 + \mathcal{L}_1 + \mathcal{L}_2 \quad (1)$$

$\mathcal{L}_0$ 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
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)

“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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