

Dynamical Electroweak Symmetry Breaking Review

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DYNAMICAL ELECTROWEAK SYMMETRY BREAKING

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In theories of dynamical electroweak symmetry breaking, the electroweak interactions are broken to electromagnetism by the vacuum expectation value of a fermion bilinear. These theories may thereby avoid the introduction of fundamental scalar particles, of which we have no examples in nature. In this note, we review the status of experimental searches for the particles predicted in technicolor, topcolor, and related models. The limits from these searches are summarized in Table 1.

- Technicolor (14/24 pages)
- Top-Condensate, Higgsless, and “Related Models” (5.5/24 pages)
- References (4.5/24 pages)

What now?

“I’m doubtful that the review section can really continue as is - so many of the analyses that we reviewed no longer make sense as credible models of EWSB given that the Higgs seems to be SM-like and weakly coupled.”

“So we could either do a dramatic prune and rewrite - basically do a review of Dynamical models that are consistent with a 125 GeV scalar with SM-like couplings - or we could just let it lapse.”

John Womersely

EWSB Topics that need to be reviewed in RPP

- Is the observed scalar fundamental or composite, and what does this mean? (EFT)
 - Theoretical review and literature guide
 - Direct Bounds (couplings vs. SM)
 - Indirect Bounds (EWPT, especially T)
- Searches for scalars of an extended EWSB sector involving composite bosons.

Will these be part of the scalar boson review?

Other EWSB-related topics to consider

- Weak gauge-boson self-coupling measurements
- Searches for resonances decaying to pairs of weak gauge-bosons
- Searches for an extended $SU(3)_C$ sector: colorons, top-gluons, axigluons, etc.

Where should these topics go?

In what context? DEWSB, Extra-D, ...

Advisory Committee Recommendations

reviews of Electroweak, Top, SUSY, Dynamical Electroweak Symmetry Breaking, Extra Dimensions, and Compositeness (especially in models of composite Higgs bosons), should be updated to incorporate the new discovery in a consistent and coherent way

separating composite Higgs from technicolor

Also the section about bounds from compositeness only really refers to bounds on higher dim' quark operators. Now there are bound on Higgs compositeness, maybe there should be consideration to mention this and refer to the bounds in the Higgs review.

Slide from John Terning