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Constraining models with an additional large electroweak scalar multiplet

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Models with a single additional large electroweak scalar multiplet provide a simple extension to the Standard Model. Such models may also provide a natural dark matter candidate. It is then of great interest to determine what constraints, if any, are to be placed on these models. In this talk, we examine two different classes of models: those with an accidental $U(1)$ symmetry, and those with an imposed Z_2 symmetry. We use a combination of tree-level perturbative unitarity, electroweak precision measurements, cosmological relic density, direct detection limits, and LHC studies to constrain these models.

Primary author: PILKINGTON, Terry (Carleton University)

Co-authors: LOGAN, Heather (Carleton University);   HARTLING, Kathryn (Katy) (Carleton University);   Dr MARTIN, Travis (TRIUMF)

Presenter: PILKINGTON, Terry (Carleton University)

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