Contribution ID: **41** Type: **Plenary Talk**

New physics at the EW scale and the production of multiple leptons at the LHC

A number of features of the Run 1 data impelled us to hypothesize the existence of a heavy boson with a mass around 270 GeV that decays predominantly into Sh, where h is the SM Higgs boson and S is an additional boson. A number of predictions are made. This includes the anomalous production of opposite sign di-leptons, same sign di-leptons, three and more leptons. These multi-lepton final states appear with and without b-tagged jets. Run 2 data with multi-leptons is compared to these predictions. A large discrepancy between the data and SM MCs is observed cannot be resolved with available tools. These results are interpreted in terms of H—>Sh produced via gluon-gluon fusion and in association with top quarks. The compatibility of the results with the current Higgs boson data is discussed.

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