ATLAS: LHC 2016: 240 GeV Higgs Mass State at 3.6 sigma

Frank Dodd (Tony) Smith, Jr. - July 2017 - viXra 1707.xxxx

5 July 2017 ATLAS released ATLAS-CONF-2017-058 saying:

"... A search for heavy resonances decaying into a pair of Z bosons leading to l+ l- l+ l- ... final state... where l stands for either an electron or a muon, is presented.

[that includes the Higgs -> ZZ* -> 4l channel]

The search uses proton–proton collision data at a centre-of-mass energy of 13 TeV corresponding to an integrated luminosity of 36.1 fb-1 collected with the ATLAS detector during 2015 and 2016 at the Large Hadron Collider ...

excess ...[is]... observed in the data for m4l around 240 ... GeV ...

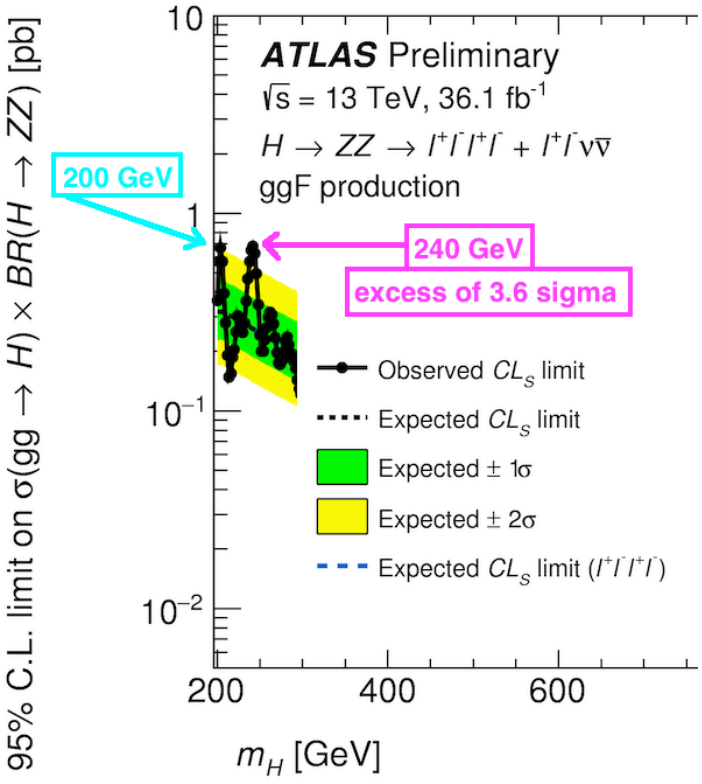
with a local significance of 3.6 sigma

estimated under the asymptotic approximation,

assuming the signal comes only from ggF production ...

The excess at 240 GeV is observed mostly in the 4e channel ...

Figure 6 presents the expected and observed limits at 95% confidence level on sigma x BR(H->ZZ) of a narrow-width scalar for the ggF ... production modes, as well as the expected limits [figure truncated to relevant 140 - 300 GeV range]...



..."

E8-Cl(16) Physics Model (viXra 1602.0319) has a Nambu-Jona-Lasinio (NJL) type structure for the Higgs-Tquark system resulting in 3 mass states for them, the **3 Higgs mass states being around 125 GeV (observed) and 200 and 250 GeV**.

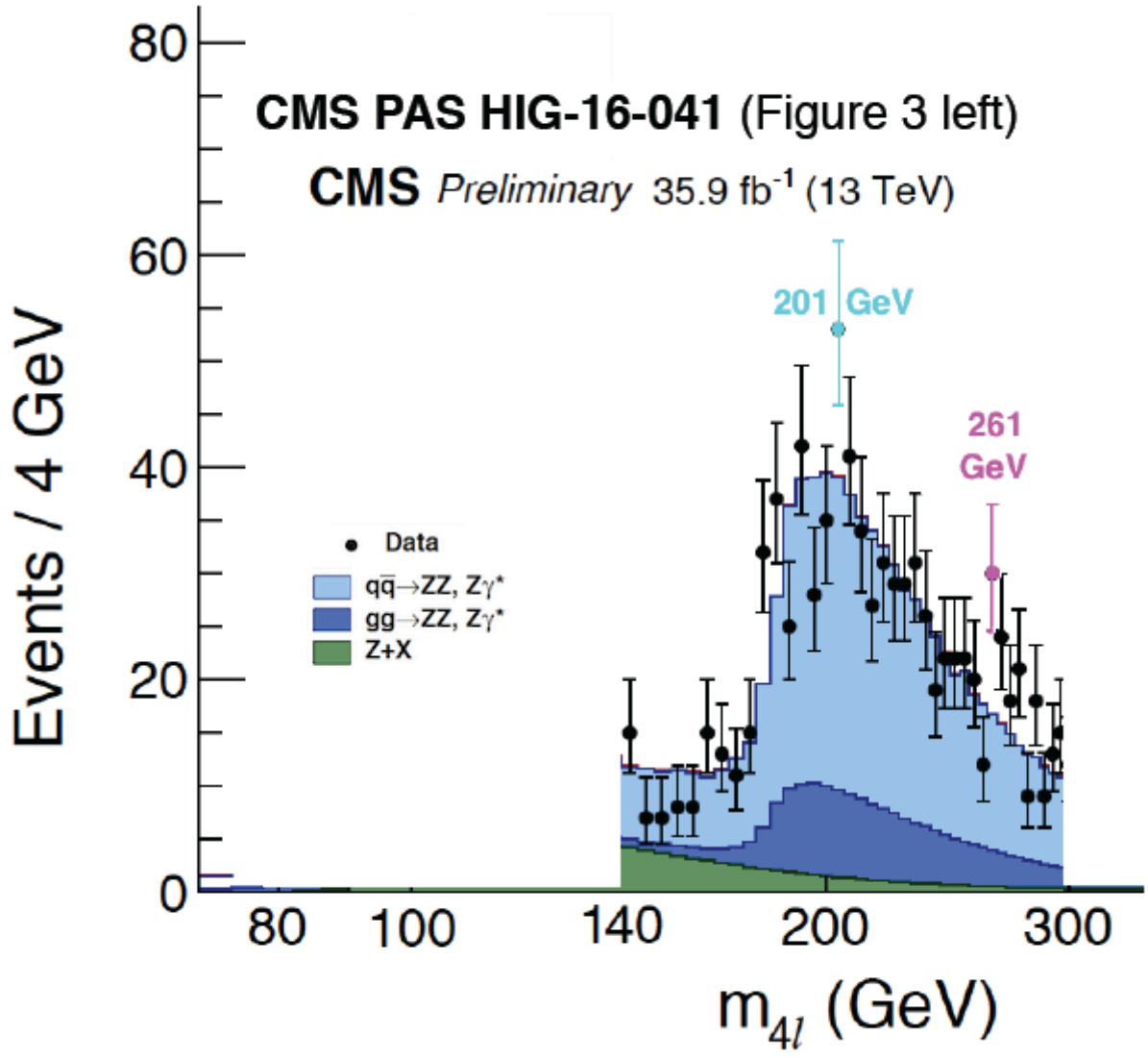
240 GeV is close enough to 250 GeV that the ATLAS 3.6 sigma peak should not be suppressed by LEE.

Background and Histograms:

CMS in CMS PAS HIG-16-041 dated 13 April 2017 released their histogram of 35.9 fb-1 of LHC data for the 13 TeV run (2015-2016) using a background from which two Higgs candidate peaks, one at 201 GeV and one at 261 GeV, clearly stand out.

The CMS background differs significantly from the ATLAS background.

The CMS histogram has also been truncated to the 140 - 300 GeV range that is relevant for evaluating the E8-Cl(16) physics model of viXra 1602.0319 with respect to its Higgs Mass States around 200 and 250 GeV.

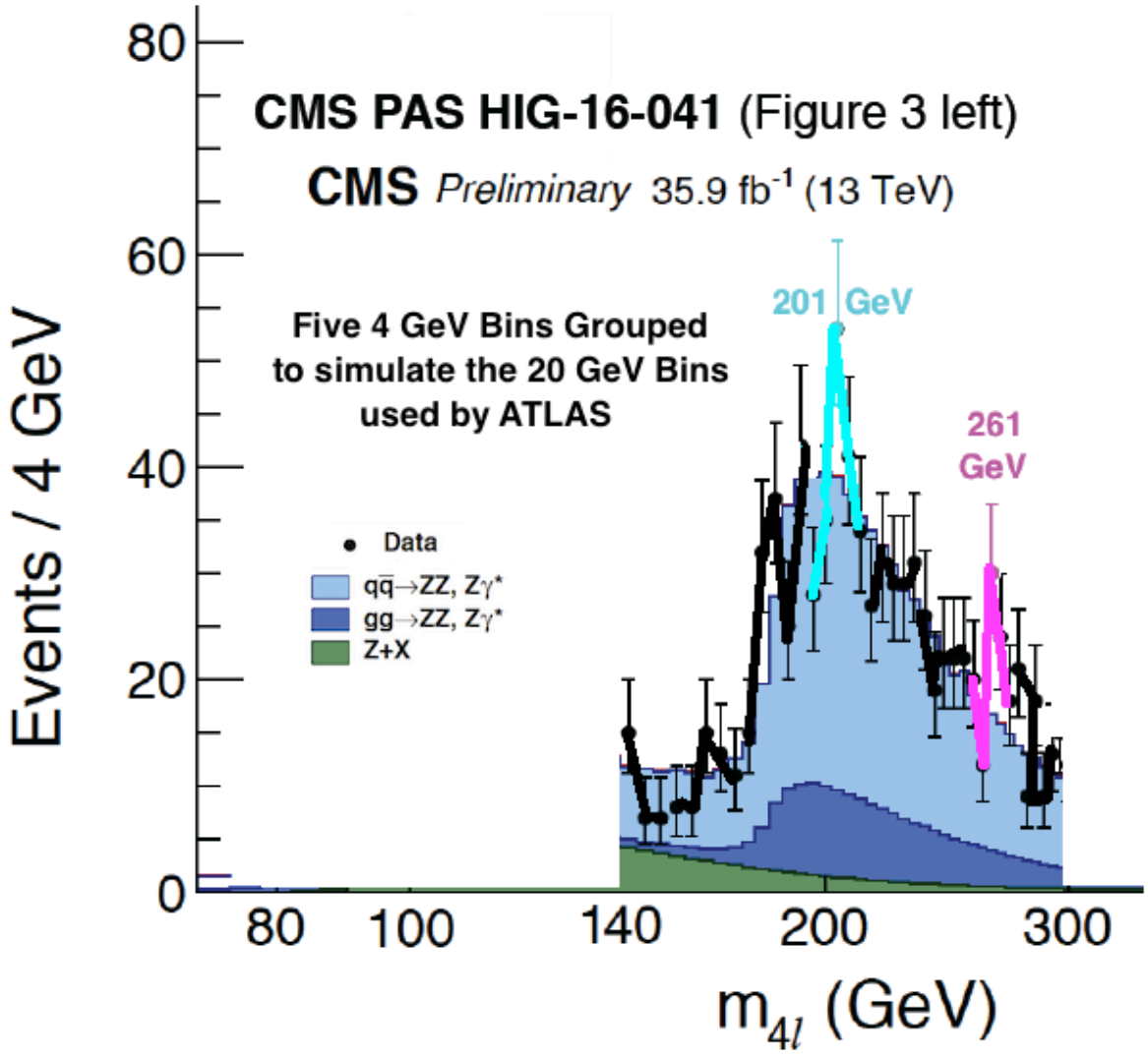


201 and 261 GeV are close enough to 200 and 250 GeV that the two CMS peaks should not be suppressed by LEE.

Also,

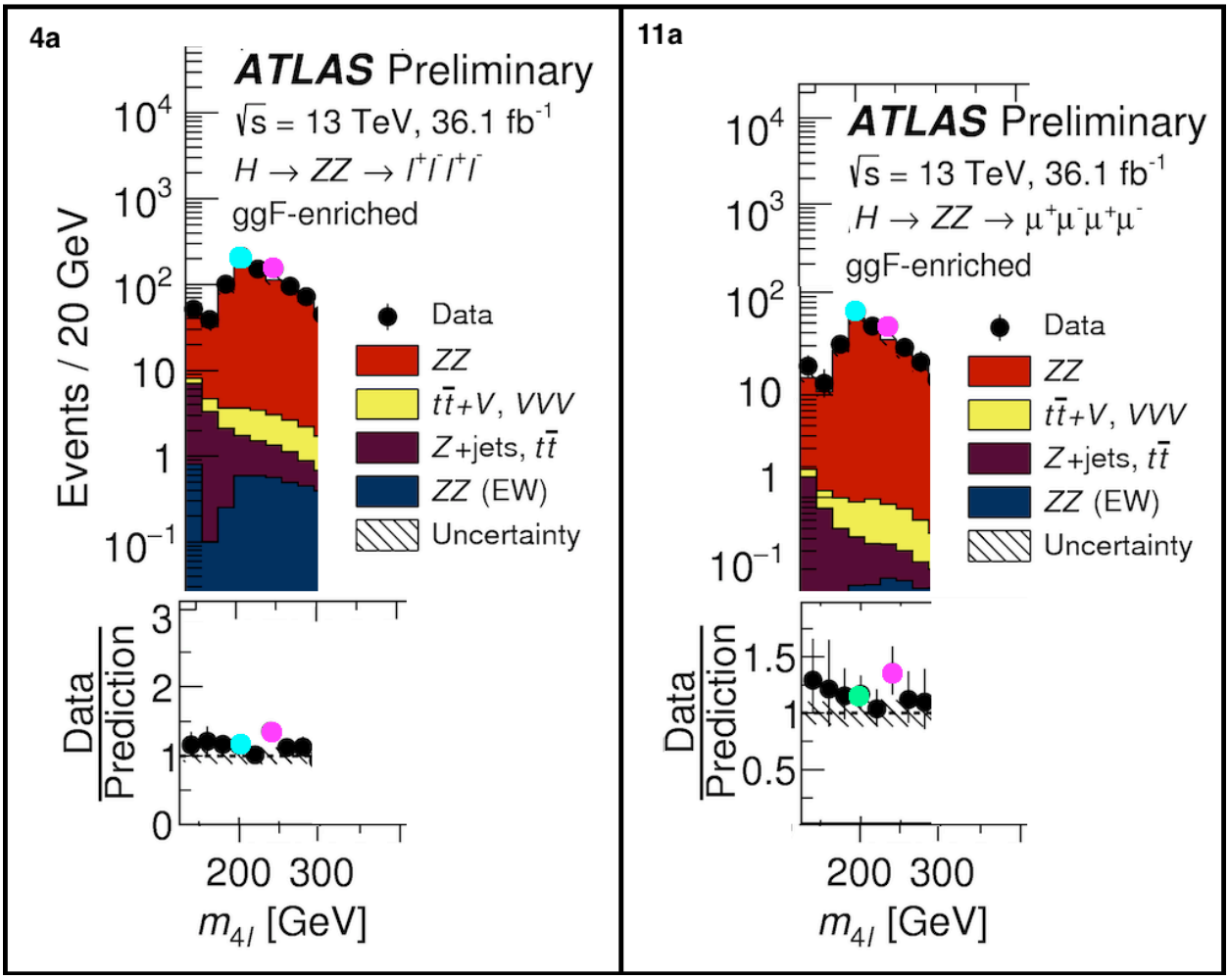
the CMS 261 GeV and the ATLAS 240 GeV are both close enough to the E8-Cl(16) model prediction of 250 GeV that they both are confirmation of its NJL sector.

The CMS histogram uses bins that are 4 GeV wide
while ATLAS uses bins that are 20 GeV wide
so
to facilitate comparison between the histograms,
here is an image of the CMS histogram with 5 adjacent 4 GeV bins
grouped together to simulate the 20 GeV bins uses by ATLAS:



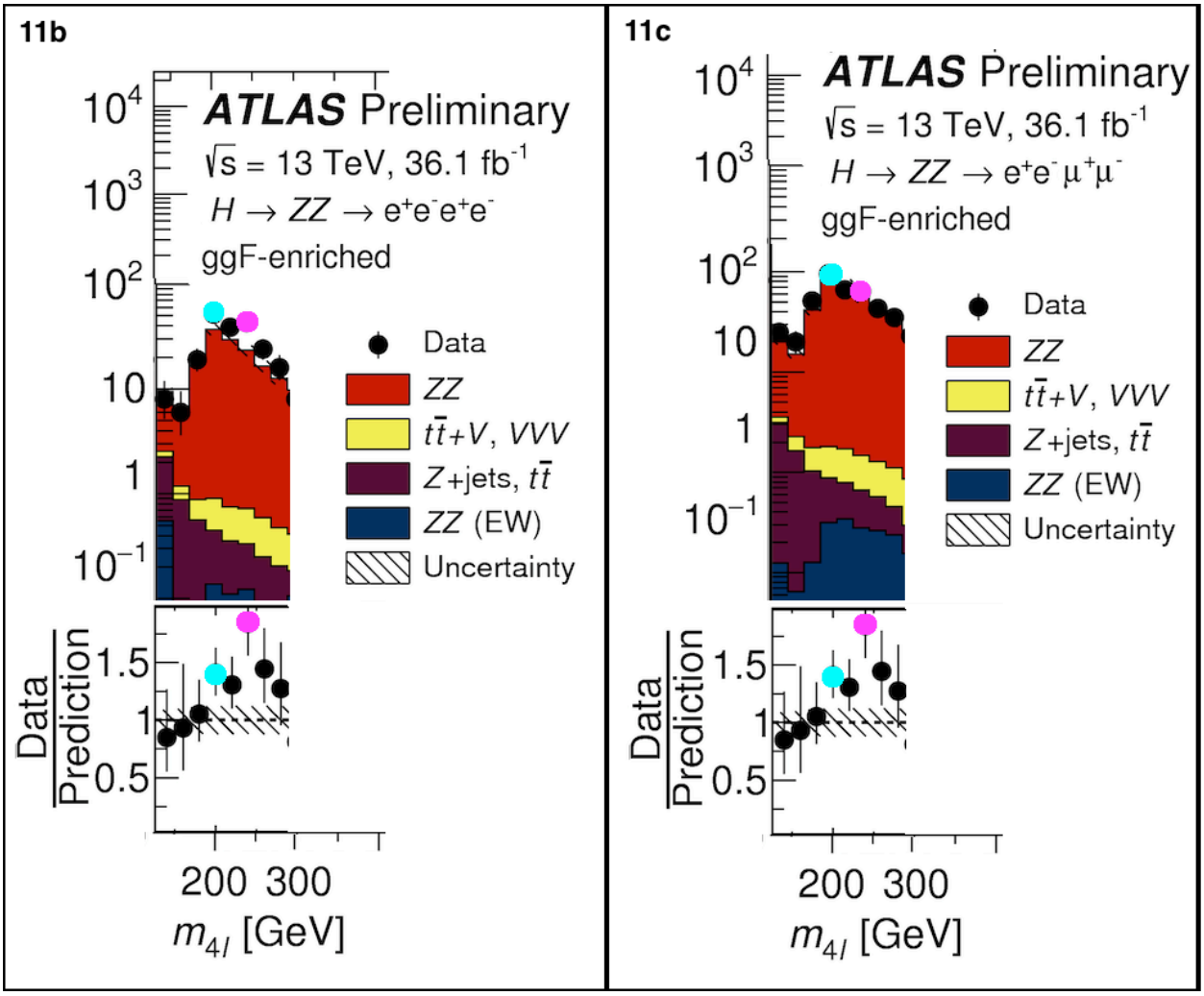
ATLAS-CONF-2017-058 has 4 histograms that cover the 140 - 300 GeV range for testing the E8-Cl(16) model in the Higgs -> ZZ* -> 4l channel -

Figures 4a (4+/- muons, 4+/- electrons, 2+/- of each)
11a (4+/- muons) 11b (4+/- electrons) 11c (2+/- of each)



It is clear from the ATLAS-CONF-2017-058 histograms of Figures 4a and 11a that the ZZ background is set so that the 200 GeV bin is the peak of ZZ background which results in no excess in the 200 GeV bin.

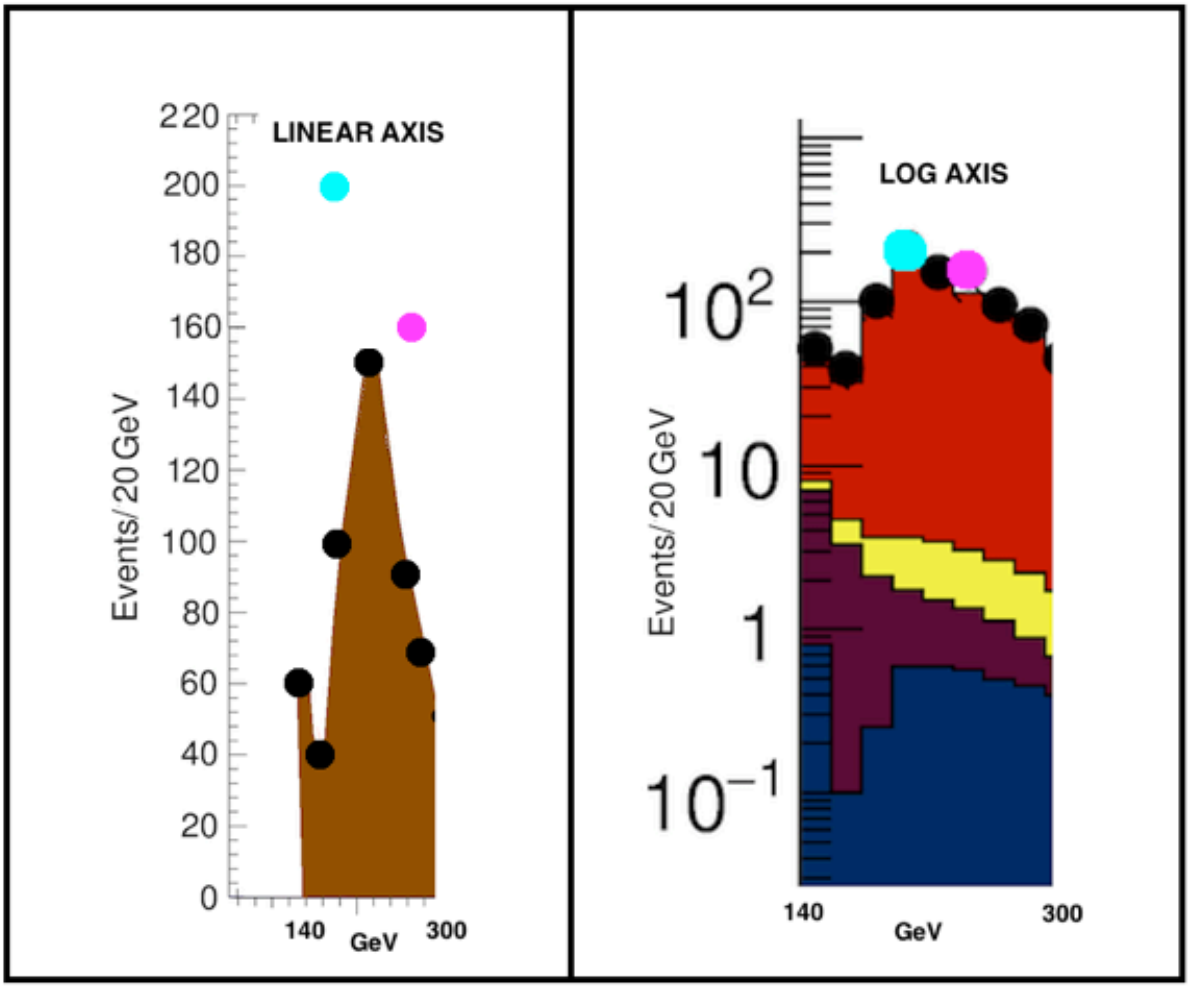
That is not consistent with the background used by CMS in CMS PAS HIG-16-041.
If ATLAS had used backgrounds of CMS PAS HIG-16-041 then excesses would have appeared in both the 200 GeV bin and the 240 GeV bin which
would be consistent with my E8-Cl(16) Physics Model with NJL Higgs-Tquark sector.



In fact, excesses do appear in both the 200 GeV and 240 GeV bins in Figures 11b and 11c. As to the 4e channel of Figure 11b, ATLAS-CONF-2017-058 says “The excess at 240 GeV is observed mostly in the 4e channel ...”.

Further, the 4 histograms of ATLAS-CONF-2017-058 use a log axis for Events / 20 GeV.

If a linear axis for Events / 20 GeV had been used, along with background similar to that of CMS PAS HIG-16-041, then ATLAS Figure 4a (right side of the following figure) would have looked something like the left side of the following figure:



It is obvious that the use of the log axis significantly obscures the excesses of the 200 and 240 GeV bins.