Golden Channel Higgs from 2/fb at LHC: 3 Higgs States consistent with ElectroWeak Gfitter

by Frank Dodd (Tony) Smith Jr.

Abstract:

2/fb of LHC data presented at Lepton-Photon 2011 indicates 3 Higgs state peaks:
low mass state (Higgs mass around 145 GeV)
middle mass state (Higgs mass around 180 GeV)
high mass state (Higgs mass around 240 GeV)
so
the Higgs is not a simple single particle
but
is part of a 3-state Higgs-Tquark system
based on Higgs as a Tquark condensate similar to descriptions in
the works of Yamawaki, Hashimoto, et al in hep-ph/9603293, hep-ph0311165, etc.

The 3 Higgs-Tquark state system is not only consistent with my E8 Physics model
but
also are consistent with Gfitter ElectroWeak plots from Higgs Hunting 2011.

Appendix 1 contains some images of candidate Higgs events.

Appendix 2 discusses claims of exclusion of Higgs mass ranges.

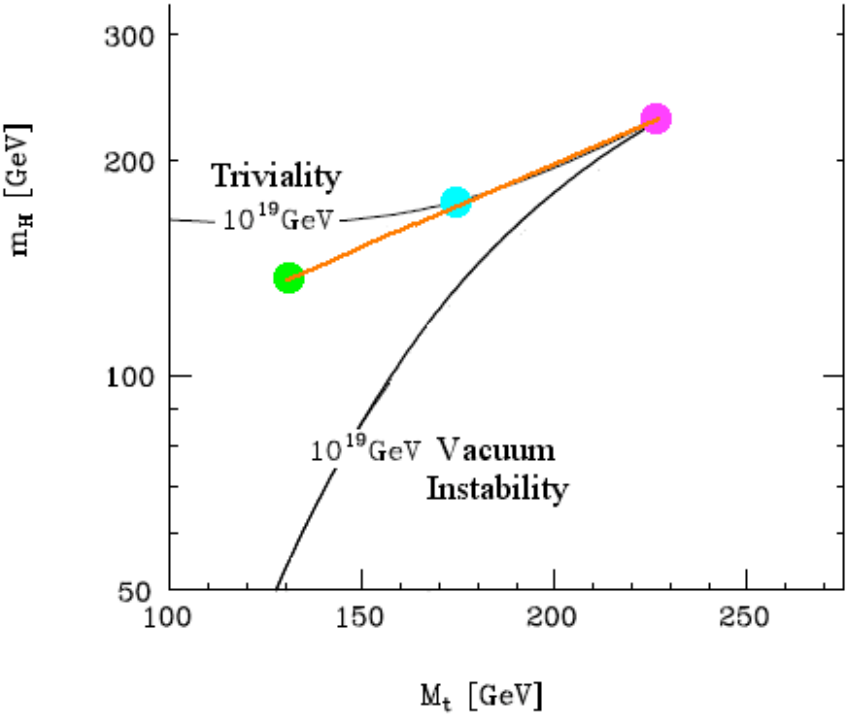
Appendix 3 discusses how the single Standard Model Higgs splits into 3 mass states.

(References are included in the body of the paper and in linked material.)

Frank D. (Tony) Smith, Jr. - 2011 - http://www.valdostamuseum.org/hamsmith/ - pdf version of this paper
vixra 1108.0027 also pdf - Introduction to E8 Physics
vixra 1107.0044 also html and pdf - EPS HEP 2011
vixra 1107.0048 also pdf - Will LEE Hide the Higgs?

Golden Channel Higgs from 2/fb at LHC: 3 Higgs States consistent with ElectroWeak Gfitter

Using the ideas of - African IFA Divination; Clifford Algebra Cl(8)xCl(8) = Cl(16); Lie Algebra E8 ; Hua Geometry of Bounded Complex Domains; Mayer Geometric Higgs Mechanism; Batakis 8-dim Kaluza-Klein structure of hep-ph/0311165 by Hashimoto et al; Segal Conformal Gravity version of the MacDowell-Mansouri Mechanism; Real Clifford Algebra generalized Hyperfinite II1 von Neumannn factor AQFT; and Joy Christian EPR Geometry - my E8 Physics model has been developed with a 3-state Higgs system:



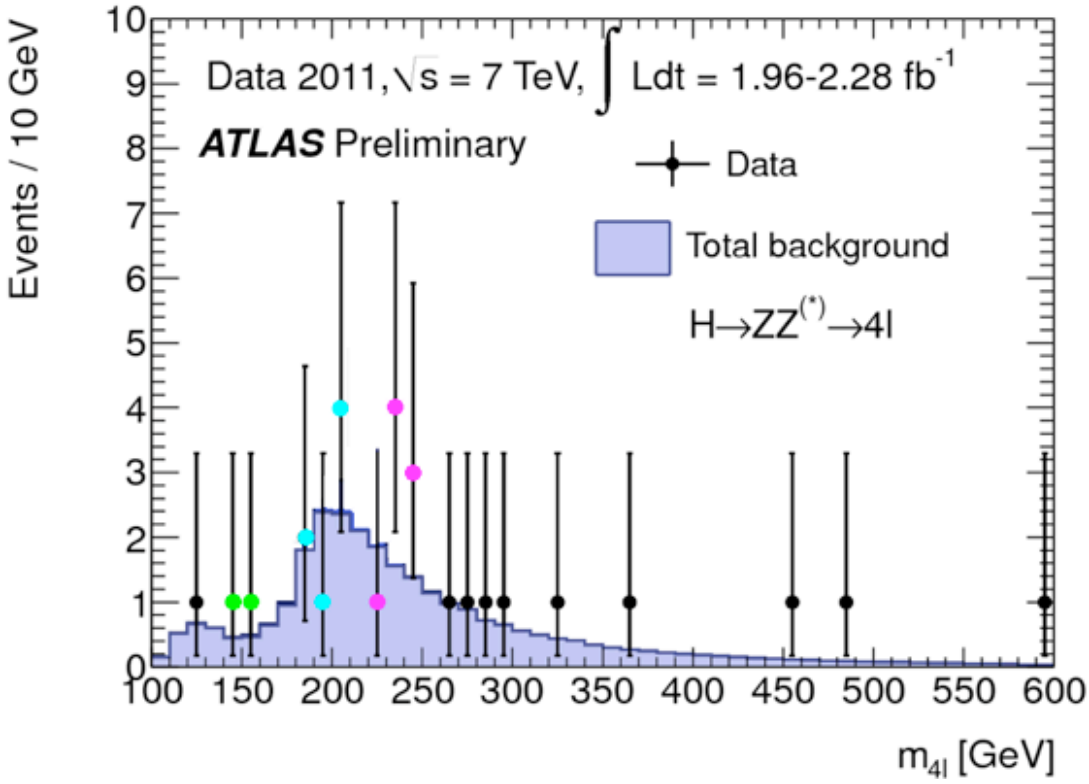
The Green Dot is the low-mass state of a 130 GeV Truth Quark and a 145 GeV Higgs.
That low-mass Higgs is in the 110-160 GeV range where a Higgs is needed for the Standard Model to work up to the Planck Scale.

The Cyan Dot is the middle-mass state of a 174 GeV Truth Quark and a 180 GeV Higgs.
That mid-mass Higgs is in the 160-210 GeV range of the Higgs Triviality Boundary.

The Magenta Dot is the high-mass state of a 220 GeV Truth Quark and a 240 GeV Higgs.
That high-mass Higgs is in the 210-260 GeV range of the Higgs Vacuum Instability Boundary which range includes the Higgs VEV.

The Higgs to ZZ to 4l channel is the Golden Channel that "... provides a rather clean signature over the full possible range of Higgs masses, with a statistics smaller than for other channels. For Higgs masses above 200 GeV, this channel becomes the "golden" channel for SM Higgs searches. ...".
(quoted from "Standard Model Higgs Boson Searches at ATLAS" by Stefano Rosati at the 2007 Europhysics Conference of High Energy Physics)

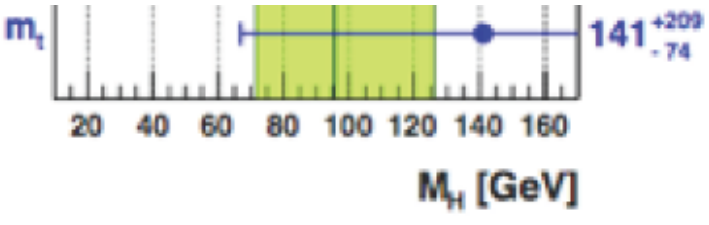
At Lepton-Photon 2011 on 22 August 2011, ATLAS presented a plot of 27 Golden Channel events for 2/fb in which



2 events (background at about 0.5 level) are around 145 to 155 GeV
7 events (background at about 2 level) are around 185 to 205 GeV
8 events (background at about 1.5 level) are around 225 to 245 GeV.

Consistency with ElectroWeak experimental results.

Phil Gibbs, in a viXra log blog entry 13 August 2011, said:
"... At Higgs Hunting 2011 Matthias Schott from the gfitter group told us that a Higgs at 140 GeV has just a p-value of 23% in which the fit includes the Tevatron data [with Tquark mass 173.3 +/- 1.1 GeV]
... This plot shows the effect on the electroweak fit of leaving out ... the measurement...



...".

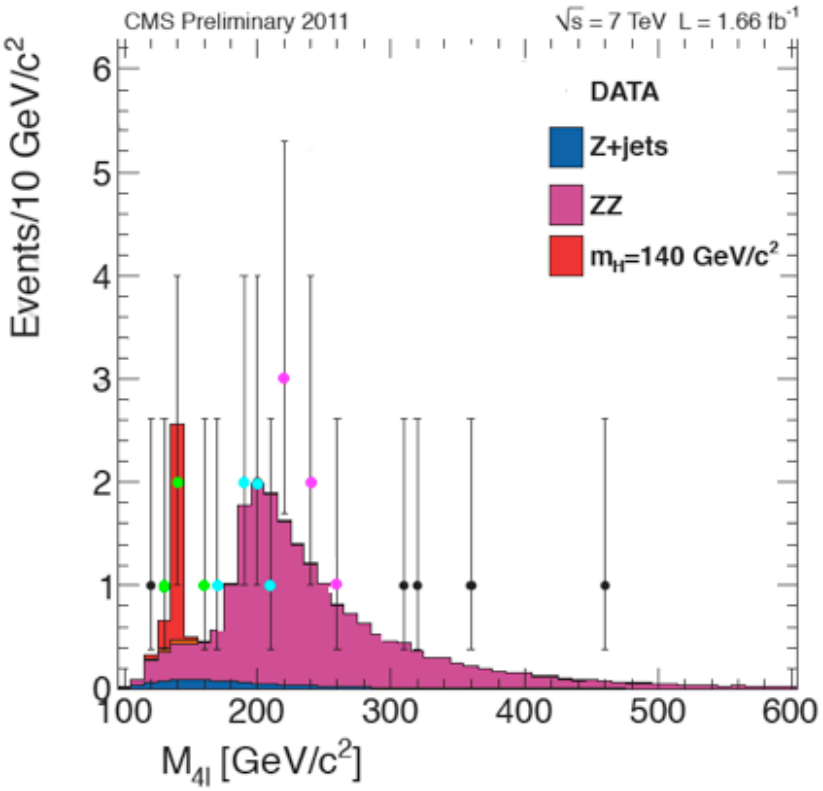
Since my 3-state model has 3 mass states for the Tquark, evaluation of my 3-state model should be done by removing the fit to the Tevatron mid-mass Tquark mass value of 173.3 +/- 1.1 GeV and allowing the Tquark mass to float freely so that it also includes a low-mass Tquark around 130 GeV and a high-mass Tquark around 220 GeV. When that is done, the Gfitter plot shows that

the preferred Higgs mass is 141 GeV which is consistent with the low-mass Higgs of my 3-state model and

the mid-mass and high-mass Higgs of my 3-state model are well within the upper bound of 341 GeV.

In my view, the Higgs is not a simple single particle but is part of a 3-state Higgs-Tquark system based on Higgs as a Tquark condensate similar to descriptions in the works of Yamawaki, Hashimoto, et. al. in hep-ph/960e293, hep-ph0311165, etc., in which the mid-mass Higgs Tquark state is associated with an 8-dimensional Kaluza-Klein spacetime a la the M4 x CP2 of Batakis (Class. Quantum Grav. 3 (1986) L99-L105).

Also at Lepton-Photon 2011 on 22 August 2011, CMS presented 21 Golden Channel events for 1.66/fb



4 events (background at about 0.5 level) are around 130 to 160 GeV.
As CMS noted, the 2 event point at 142 GeV is consistent with SM Higgs expectation.

7 events (background at about 2 level) are around 170 to 210 GeV.
These events are not as much above background as are the corresponding events in the ATLAS plot.

6 events (background at about 1.5 level) are around 220 to 260 GeV.
These events seem to me to be above background much like the corresponding events in the ATLAS plot.

In my view, the CMS Golden Channel plot for 1.66/fb of data is consistent with the ATLAS Golden Channel plot,
which clearly indicates to me that the Higgs is a 3-state system.

My view is that my 3-state Higgs E8 Physics model, in which the (suitably augmented) Standard Model remains valid up to the Planck scale, is realistic and that a useful program of future LHC exploration might

be:

Since the LHC can explore the energy region above electroweak symmetry breaking (order of 1 TeV).
and, in that region, assuming only the Standard Model plus Gravity as described by E8 Physics,
the Higgs mechanism will not be around to generate mass, so everything will be massless, and:

1 – The T and B quarks may not be so different, and the Kobayashi-Maskawa matrix may look very different,
with possible consequences for CP violation.

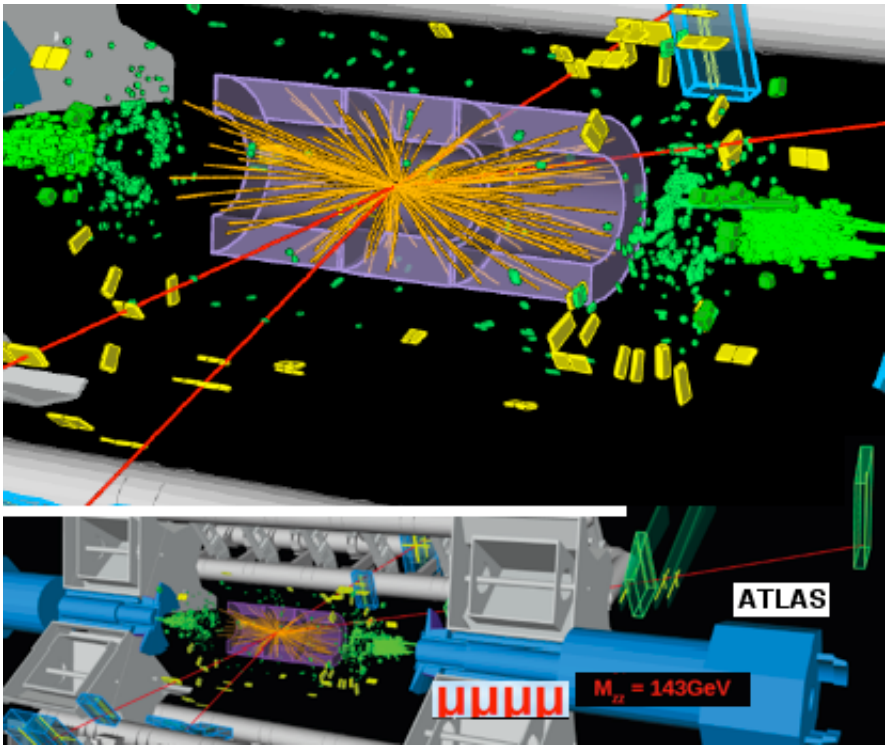
2 – Massive neutrinos may lose their mass,
so neutrino oscillation phenomena may change in interesting ways.

3 – With no massive stuff, Conformal Symmetry may become important,
leading to phenomena such as:

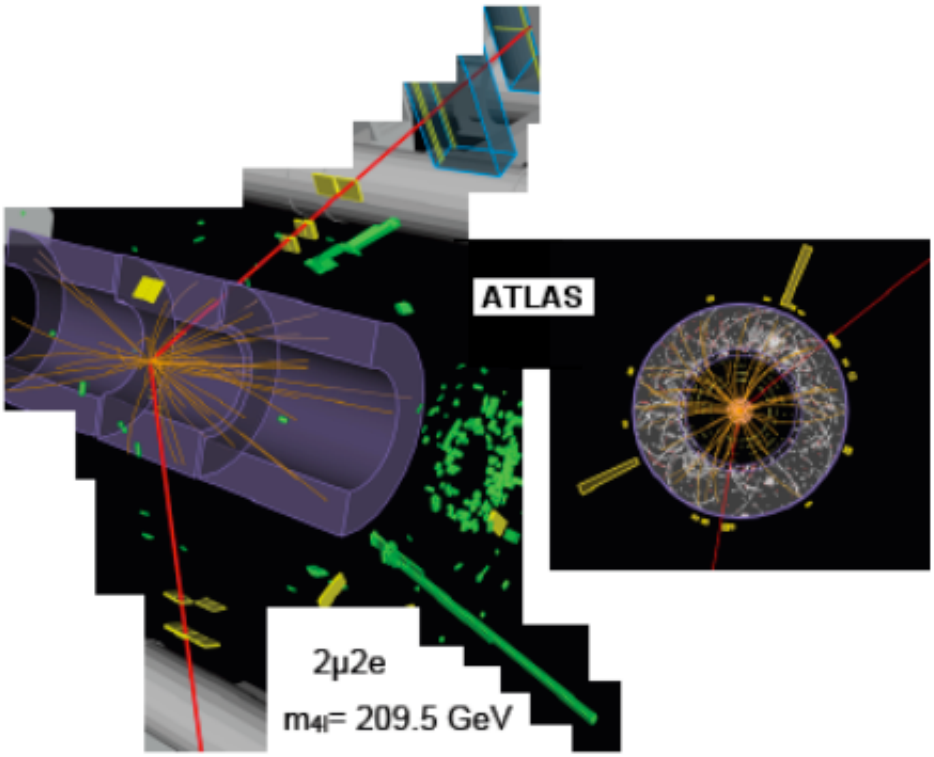
> a – Twistor stuff may be directly observable. See for example the book Mathematics and Physics by Manin, who says there:
> "… What binds us to space-time is our rest mass, which prevents us from flying at the speed of light, when time stops and space loses meaning. In a [massless] world … there are neither points nor moments of time; beings … would live nowhere and nowhen; only poetry and mathematics [and the LHC] are capable of speaking meaningfully about such things. One point of CP3 is the whole life history of a free …[massless particle]… the smallest event that can happen to …[it]…".
>
> b – Segal conformal cosmological stuff (maybe Dark Energy) may be observable;
>
> c – Since the Conformal group acts in 6-dim spacetime that could be denoted by C6,
> maybe two new large physical spacetime dimensions might emerge,
> with 4+4 = 8-dim M4 x CP2 Kaluza-Klein becoming 6+4 = 10-dim C6 x CP2 Kaluza-Klein
> perhaps leading to a connection emerging between non-supersymmetric Bosonic String Theory
> whose Lattice Affinization has Monster Group symmetry
> and
> a Bohm-type Quantum Theory based on interpreting Strings as World-Lines
> (see tony5m17h.net/MonsterStringCell.pdf and tony5m17h.net/QM03.pdf).

APPENDIX 1:

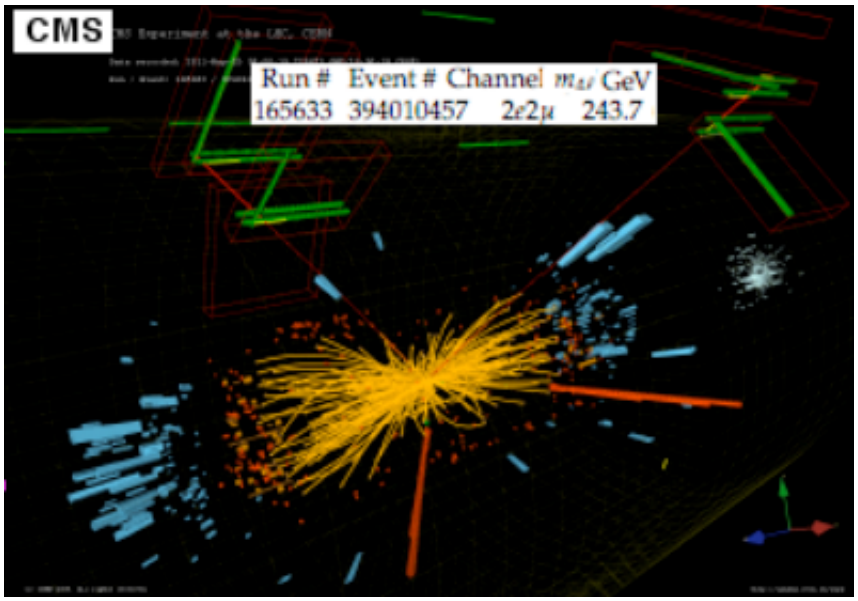
Here is an image of an ATLAS Golden Channel candidate low-mass Higgs event:



Here is an image of an ATLAS Golden Channel candidate mid-mass Higgs event:



Here is an image of a CMS Golden Channel candidate high-mass Higgs event:



APPENDIX 2:

CERN (22 August 2011 press release) said:

"... **ATLAS and CMS have excluded the existence of a Higgs over most of the mass region 145 to 466 GeV with 95 percent certainty.** ...".

CMS (22 Aug 2011 press release) said:

"... **At 90% C.L., we exclude the SM Higgs boson in the mass range from 144 - 440 GeV.** ...

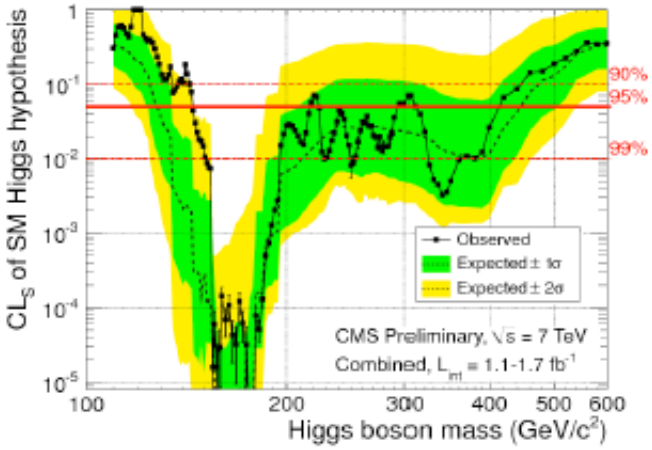
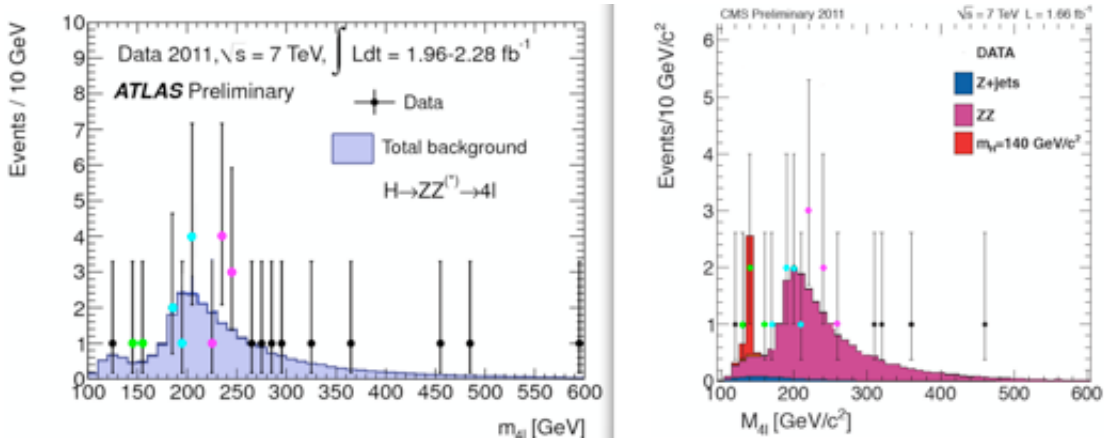


Figure 2. The combined confidence level values for the standard model Higgs hypothesis as a function of the Higgs boson mass in the range 110-600 GeV. The three red horizontal lines show confidence levels of 90%, 95%, and 99%.

...".

On the other hand, the Golden Channel observations of ATLAS and CMS discussed in the body of this paper



clearly indicate not only a low-mass Higgs state around 145 GeV

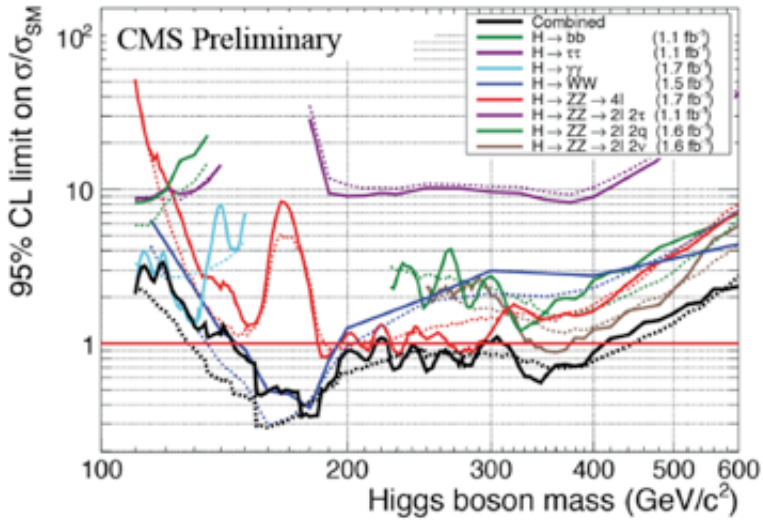
but also mid-mass and high-mass Higgs states around 200 GeV and 240 GeV.

I feel that direct counts of Golden Channel events (which show mid-mass and high-mass Higgs states)
are more likely to represent reality than more highly processed "combined confidence level values" which may contain problematic application of statistical techniques (such as the Look Elsewhere Effect - see viXra 1107.0048)

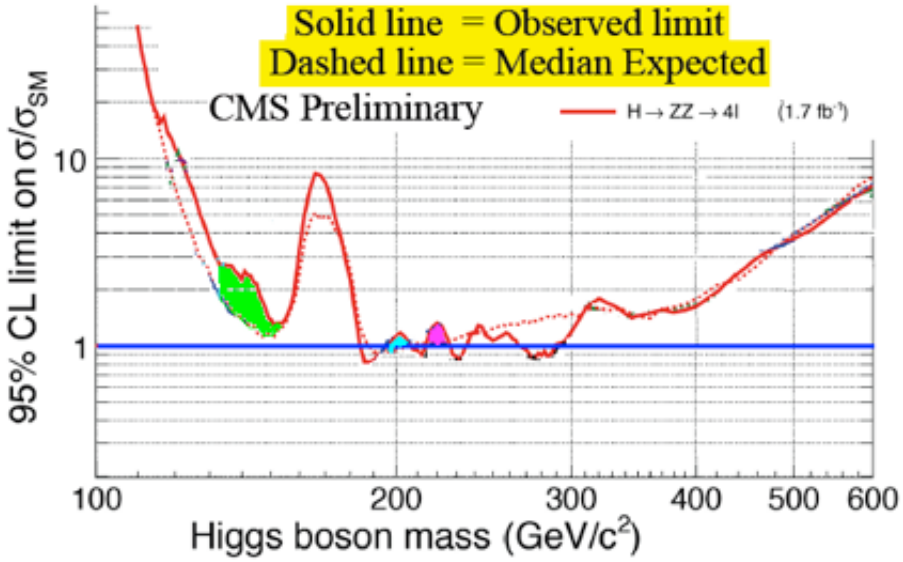
which might lead to unrealistic suppression of mid-mass and high-mass Higgs states.

Consider that the CMS "combined confidence level" Brazil band exclustion plot is made up of many channels

Solid line = Observed limit ; Dashed line = Median Expected



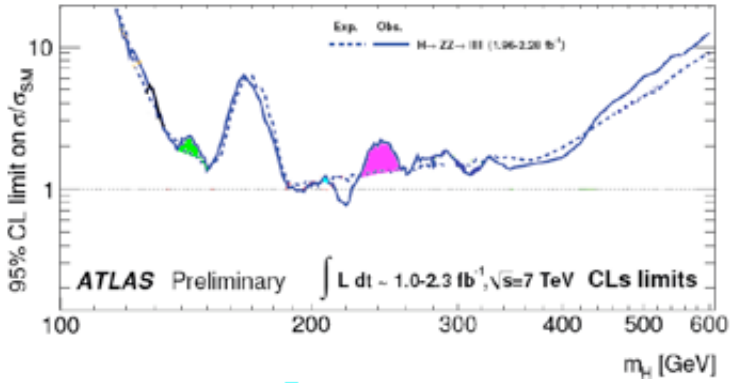
so that if some channels have erroneous suppression of some Higgs mass range the error would propagate to the CMS Brazil Band "combined confidence level values" exclusion plot.
To avoid that problem, look only at the curve for the Golden Channel Higgs to ZZ to 4l:



and note that it clearly shows not only the low-mass ● Higgs state around 145 GeV
but it also shows a very small indication of mid-mass ● Higgs (which is very small in the CMS plot)
and a larger indication of high-mass ● Higgs (mostly due to the CMS 3-event point around 220 GeV).

The deficit around 300 GeV, in my opinion, is due to phenomena of the Higgs as Tquark condensate.

The corresponding curve for ATLAS



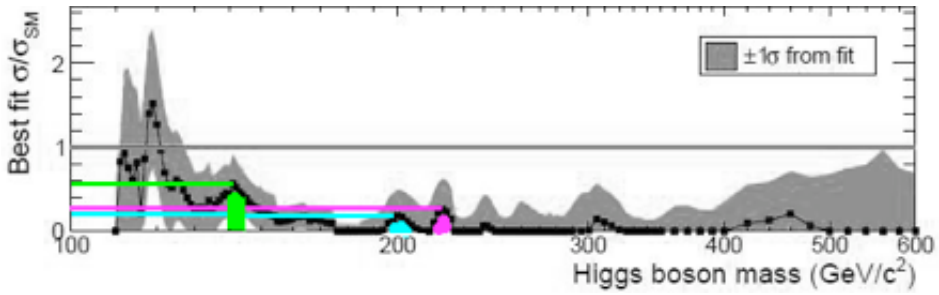
shows an even smaller indication of mid-mass ● Higgs
but shows clear indications of low-mass ● Higgs and high-mass ● Higgs.

In light of the above,
I believe that press statements about 90% C.L. exclusion of mid-mass ● and high-mass ● Higgs are really bad physics

and
that the Golden Channel indications of 3-state Higgs are valid.

APPENDIX 3:

Tommaso Dorigo in his 22 August 2011 blog post "New CMS Limits on Higgs Mass" said:
"... In the ... figure [some coloring and lines from peaks to y-axis scale added by me]...



... the "best fit" of the signal rate provided by the data, as a function of mass. ... the fluctuation at 140 GeV is less than half as strong as it would be expected to be, if a 140 GeV Higgs existed. ...".

The bottom Best-fit plot seems to me to say about my 3-state Higgs model:

There are 3 peaks that are located roughly where my 3-state Higgs model has its 3 mass states
(therefore look-elsewhere effect corrections should not be applied)
and the 3 peak heights are:

> low-mass (around 140 GeV) peak is 55 per cent of what a SM Higgs should be;
> mid-mass (around 200 GeV) peak is 20 per cent of what a SM Higgs should be;
> high-mass (around 220 GeV) peak is 25 per cent of what a SM Higgs should be.

If you add the strengths of the 3 peaks you get 55 + 20 + 25 = 100 per cent
therefore
if you regard my 3-state Higgs model as splitting the single SM Higgs into 3 states,
it seems that the CMS Best-fit plot supports my 3-state Higgs model.