

# Marumi Kado – Lecture 2 Questions

Questions marked in green were answered during the Q&A session. Original questions listed without correction for grammar/spelling. Where a slide number was given it is shown.

- Q1 (slide 22) Could you explain the x-axis in this plot in a little more detail?  
( $\theta - \theta_0 / \Delta(\theta)$ )
- Q2 (slide 21) Not sure I understand the note. If I understand correctly the plot, if we have a pull in one of the nuisance parameters that is around 1 then this means that our fit prefers a value for this parameter that is 1 sigma away from our initial assumption, which is the auxiliary measurement. Is this right?
- Q3 (slide 27) All ttH measurements have slightly low mu, what systematic concerns have been considered ?
- Q4 (slide 27) What explains the big difference in sensitivity between CMS and ATLAS in this analysis?
- Q5 Can you say something about the prospects for  $h \rightarrow Z + \gamma$ ?
- Q6 Can you comment on CP measurements in non-tau pair channels??
- Q7 (slide 30) why the uncertainty of CMS measurement is much less than ATLAS?
- Q8 (slide 34) How "cross check" was actually performed in the mbb distribution?
- Q9 (slide 42) How do we see that the kappa framework loses the gauge invariance of the SM?  
  
Excellent question, precisely in the same way as the SM is not gauge invariant without the Higgs boson, that is the simplest way to see it. For example, a simple mass term for fermions is not gauge invariant because of the coupling of an SU(2)L doublet with a singlet, if the mass is not precisely corresponding to the Yukawa coupling and the vev you will always have a component of doublet-singlet coupling that will not be explained. It is the same for the gauge boson coupling, without the correspondence between the mass, vev and couplings, the theory will not be gauge invariant.
- Q10 (slide 47) What is the difference between  $B_{BSM}$  and  $B_{undet}$ , and is it meaningful that the latter constraint is stronger?

