Many (all) the questions have been answered during the Q&A period. Nevertheless, we ask that you provide written answers below so students can come back to read them again. Thanks!

1. The electron and the muon are only different in their mass. So if they had the same mass for more flavour symmetry, wouldn't we actually not be able to differentiate between them as separate flavours at all?

This is a good question, if the SM had an enhanced flavor symmetry like this it would indeed be hard to distinguish experimentally. However, you could ask for the cross section of producing the particle and then seeing you were off if you assumed only 1 particle was there, or then correlated QM effects like the running of couplings which would be incorrect if you assumed there was only 1 particle.

2. (Page 29) Could it come from Higgs singlet of SU(2)? What is the difference to gain mass from triplet or singlet or doublet?

At the renormalizable level you can't pick up mass from a Higgs singlet of SU(2) since you can't write down such a term. With different representations of SU(2) the gauge bosons would pick up a different pattern of masses than they do in the SM. For fermions, a higgs triplet is an interesting case since you can write down a renormalizable neutrino mass (one of the examples of the seesaw mechanism).

3. Why mass term should be mPhi ^2? Is that kind of interaction of phi interact with phi?

Mass terms are always quadratic in the field. It's not always done this way, but you can treat mass terms as an interaction term assuming only a kinetic term (this is useful if working in the flavor basis and the mass terms have off diagonal pieces).

4. (Page 45) LEP tells us there are 3 flavors of light neutrinos. Is this what you mean by suggestive? How do you see this fitting into the picture of fermion generations?

Yes, that's what I meant by suggestive. However, that only says that neutrinos with masses below mz/2 are constrained, since otherwise they don't contribute to the Z width. This is also why I emphasized that Higgs physics is flavor physics, since from the CKM perspective you can't rule out a 4th gen. It's only when you correlated to the fact that if there was a heavier 4th generation it would have to have a stronger coupling to the Higgs and you can rule out a 4th generation.

5. If one generation of a fermion only differs from another generation of the same fermion by its mass, why can't the three generations be explained by a running of the Yukawa coupling? (Ignoring CKM matrix and CP violation)

I'm not entirely sure if I'm answering the question as intended (so feel free to follow up), I am interpreting this as what if all the generations had the same Yukawa at some scale and then the running made them differ at low energy? Some of this is studied in the context of GUTs where leptons and quarks are in the same multiplet and then the running causes them to split (you can look up something called b-tau unification). However, in the context of the same flavor of particles, you have to assume some extra information that distinguishes them otherwise the running doesn't differ.

6. If we have generation number more than 3, what Is changed and can be studied in theory?

If the generation is heavy then it changes Higgs physics dramatically. If it were light it would affect Z decays. That's why we're very confident there are only 3 generations (where in this case I mean a generation as an exact copy of one of the previous generations, and not something that adds more particles than a generation/changes how it gets its mass).

7. Could it be then that there are many flavors and a lot have the same masses?

For sure, just not of the SM particles as it turns out. However, in many BSM theories, or just generically in QFT, it's the number of light flavors that dictates the dynamics of gauge theories and the individual questions that we ask about SM flavor normally are secondary.

8. if we break all the flavor symmetries, could we obtain a random Yukawa matrix or not?

In the SM the flavor symmetries are maximally broken, although there are some interesting approximate symmetries e.g. the first generation quark splittings compared to 2nd and 3rd. There are theories based on anarchic/random Yukawa matrices in the literature. Unfortunately like all the theories I discussed, none really stand out as explaining more than others or get all the details right.