Xiangyang *to Patrick*: “Are you going to take minutes?”
Patrick: (audible sigh) “I guess.”

Emily *to Mark*: “Did you print out the author list?!”
Mark: “Ja*” (*yes)
E: “and single sided?!”
Audience throws verbal abuse at Mark for ~2 minutes

Marjorie: “Just an announcement, 290E is going to be at 4pm on Wednesday, so you might want to move this meeting. It’s low energy tests of high energy theory. We’re hoping it will get some AMO people to sign up.”

X: “shall we start?” *summarizes what we went over last week*
X: “for section 4, the central part is eqn (1). Do I need to explain the meaning of this eqn? There are two signal regions, one with 1 b-tagged jet and one with 2. Because the events *should* have 2 b-jets, the b-tagging efficiency must be put into these eqns.”

X: “Table 2. MisID leptons comes from another control region. The others come from MC.”

X: “Section 5. How did they estimate the background. Can someone summarize? I don’t want to keep talking.”
Cesar: “combination of MC and data. They used same sign e-mu, which is not signal”
X: “why expect similar rates of mistagging in same-sign and opposite-sign channels? What is the main background we’re trying to estimate?”
Marjorie: “one of the major problems with ATLAS terminology is that we call real, but non-prompt, leptons ‘fake’, even though they’re real leptons. Sometimes. You have to read the paper to determine what they’re really calling fake.”
X: “a motivation to use SS channel for mistag rate, is that charge identification should not depend on whether the events is SS or OS.”

Controversy about table 3
E: “are all these fakes?”
Marjorie: *sincerely* “why is the conversion rate higher in OS than in SS?”
X: “They don’t seem to have an explanation”
M: “I find it very disconcerting. Someone should figure this out for next week.”
X: “**That would be a good homework.**” *Looks at Patrick as if to make sure he is writing that down, or else as if expecting him to do the figuring out*

X: “Ok, systematic uncertainties”
C: “this is common practice, right? To take the difference between different generators.”
M: “note that the major systematic is hadronization MC modelling, so it’s worth it to study that in detail to reduce it.”
X: “why is the beam energy listed? How is cross section related to beam energy?”
P: “the theoretical cross section depends on the center of mass energy”

See Fig 72.1 of pdg<- the top quark review
X: “the top cross section jumps a lot more than most other cross sections.”
M: “at tevatron, run 1 was 1.8 TeV, and run 2 was like 1.96 TeV. That causes ~30% increase in top cross-section! You can get a very good top mass measurement by using eplus-eminus and scanning the beam energy.”

X: “ok if there’s nothing else to discuss about systematics, we’re at the results. I don’t really have many questions about the results.”
C: “did CMS already release a result at 13 TeV?”
E: “yes before this paper. But with less data”
M: “given the low systematics, I don’t know if we needed so much data.”

X: “Now to the top mass measurement. We have 20 minutes. I want to use Yvonne’s slides.”
N: “what does this ‘fate of the universe’ stuff even mean? Is it talking about the higgs quartic coupling, which could become negative?”
Xiangyang shows review link, figure 1b: RG flow of Higg quartic coupling depends on top mass
M: “that all kind of assumes there’s no new physics until plank scale”

M: “I think both CDF and D0 both underestimated the theoretical uncertainties of the top mass. So CMS and ATLAS either have to also underestimate or have less good-looking measurements”
she doesn’t believe it, which is ~~controversial~~
M: “to measure eg W (color singlet) mass, you’re looking at the decay products, which are really well defined. For top, which is not singlet, it must be produced along with something else colored, so there is a color flux tube, within which it is hard to say where the particles ‘truly’ came from. Anything that depends on decay products below about 1 GeV becomes a big problem.”

X: “let’s go through some methods. First, the template method. You have different MC templates depending on top mass, and then see which template best fits the data.”
M: “I’m ed-board for paper where they’re using template method that uses two muons, one from the top’s W and one from the associated b-quark’s decay.”

X: “matric element method. Probably in leading order, you can calculate probability to see different final states.” *Yvonne slide 46 and 47*

Mark: “what is JES?”
X: “Jet energy scale”
C: “Isn’t that a dominating uncertainty a lot of the time?”
X: “yeah”

Looking at X’s slide 7: summary from LHC top WG
X: “It looks like we’ve got measurements from most decay channels”

M: “It also looks like ATLAS and CMS’s measurement is systematically shifting downwards from the previous world average. Such time creep in measurements is normally a sign that someone underestimated their uncertainties.”

X: “you can get top quark mass from cross section measurement, because that depends on top quark mass, if you only use standard model framework.”

Mark struggles to stay awake

X: “lastly for today, you can get top quark mass from t-tbar + jet. Radiated gluons depend on top mass.”

C: “what are prospect for ILC/ future colliders in terms of this.”
M: “maybe big collider in China, where you would first put in eplus-eminus. Still in R&D phase. Probably more likely than Japan’s ILC. They’ve got lots of tunneling equipment because of all their subway construction.”
Mark: “why non linear collider?”
M: “you only get one shot for acceleration’s sake, and need super small beamspot to get good lumi. The physics usefulness is also getting weaker, because we haven’t found anything new at a low enough energy.”
Mark: “I thought you could get higher energy at linear due to bremsstrahlung”
M: “maybe if it’s long enough. Technologies to go above 1 TeV are still in R&D phase.”