

# Questions to the B-physics course

From Xola : What physical properties do particles in the same generation have in common. Is it just mass?

Indeed, there is more similarity between particles of different generations, for instance electrons and muons, than electrons and electron-neutrinos

From Rafik Er-Rabit : When we say that the CP violation is well explained within the framework of the SM, does that mean that the matter-antimatter asymmetry is also explained !?

No, we know that the amount of CP violation we observe is not sufficient to explain the matter-antimatter asymmetry

From Xola : 1) Has evidence been found of these rare jumps between generations?

Yes, we regularly observe  $b \rightarrow u$  decays

From Xola : 2) Since there is exchange of w boson in the oscillation between the b and anti s quarks, does that mean that the weak force influences this oscillation?

Yes, b oscillations are due to the weak force

From Xola : Why does the b and anti b not annihilate?

They do! In fact the Upsilon particle decays into a muon-antimuon pair as an effect of the annihilation

From Xola : How do jets fake leptons?

For instance, a photon with a nearby track can fake an electron

From hamza abouabid : if we find a CP violation on the lepton sector or a right hand neutrino, can we explain then the matter-antimatter asymmetry or it will not be enough ?

It depends on how much the CP violation is. But you also need lepton flavour violation (predicted by several theories) to transfer the asymmetry from leptons to baryons