A Few Discussion Inputs for 23. Bled Workshop

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How to get Excess of say Baryons over Antobaryons?

Yasutaka Takanishi and I had once in a model in which we had fitted with about 5 parameters, which though as somebody pointed out to Yasutaka ALLWERE 1/10,the small hierarchy, i.e. the masses of mixing angles quarks and leptons in a model also the gauge symmetries comming in families. Then finally we had expexted that with so much fitting- even if model were somewhat worng - you should get the right excess of baryons in the cosmolgical estimation of an excess of lepton number being converted into a baryon assymmetry (by the anomaly). But alas: We got too little assymmetry by a few orders of magnitude.
A speciallity of Yasutaka (etc.) was that the assymmetry should come from a seee-saw neutrino, which was not the lightest one in the flock of three see-saw neutrinoes.

Yasutaka Takanishi and mine trouble continued:

Then the lightest see-saw neutrino which only violated CP exceedingly little washed away at first formed assymmetry.
But what I think would help is **if at the time of see-saw netinoes - i.e. when the temperature is about the mass of our model see-saw neutrino masses , say** 10^12 **GeV, were bigger than we and one normally assume.**
If one usually forget say domaine walls, the correction to include them, could it give us faster expansion in the see-saw era?

Second point on matter antimatter assymmetry, now for dark

Very popular models take the dark matter to be Majorana (its own antiparticle) from supersymmetry; but being its own antiparticle makes the choice of a simple $U(1)$ symmetry unable to make it stable, so that some very new conservation is needed to make it stable. Dark matter needs exceptionally strong stability. Our own pearls seek to inherity and reuse the baryon number for their stability.

Why just 3 families ?

In a way Kobayashi and Maskawa already answered that we need CP-violation and thus (in Satandard Model) need at least 3 families.
If we had lot of talks I should have given one with Astri as collaborator about "Abstract Confusion":
Dream that e,g, complicated gravitational quantum mechanical fluctuations - J. Wheelers space time foam - in a local way would have a wormhole like structure withe property that if you prescribe any symmetry you can find a worm hole or rather huge amounts of them all over, so that going through the worm hole you end up when comming back as transformed by the chosen symmetry.
This is called "confusion" because after such a tour in the wormhole you are confused as to whether you are refected under the symmetry or not.

Why at least 3 families continued

Niels Brene and I wanted to use this confusion to argue that the symmetry of the true physics should be as little as possible. The gauge group say should have relativly few automorphisms. But just now you should avoid the CP-symmetry: so we need at least 3 families!