BT Meeting Minutes 7 May

Results from pedestal temperature corrections

LSR: is the twr3 systematics understood there?
AC: there is some backtail of the energy deposition, they are all negative, so that is beam induced bias from the beam. this run was taken with 500MeV beam, so the bias is 0.3MeV so really small. and since it happens at both ends of thextal it should not affect the position measurement. when we have the beam, the pedestal is a bit different, that is clear, but it is a small correction

New sims - Johan

JB: actually run 2039, 50GeV electron at 0 deg in twr2. LAC distribution for data, old and new MC ; the peak is much closer to the data now.
3: some relevant distributions (data in black, old MC in red, new MC in blue). CalNumHit is now matching with data! As I have said, in this new sim we have both realistic LAC thresholds and LPM off. For these distributions the main effect comes from LAC thresholds. CAlTransRms also benefits from corrected LAC thresholds, while the energy distribution is not improved
3: other variables greatly improved by corrected LAC thresholds, I did not expect that, this is very good. Lowering the LAC threshold really makes a big difference, and we are almost matching data, which is obvously very good.
5: conclusions. You can check all the other relevant merit quantities and the improvement in data-MC agreement from the BtSystest report linked in the agenda

EB: in 2 data disagree with MC, it is better than it was, but the distribution is much different! I wonder if this is the cause for the residual difference in data-MC comparison. Can we not just input the real values in the MC?

JB: maybe Sasha can comment on the broader LAC distribution in data, we decided not to make more tuning other than moving the average, the reason being that data distribution is broader for pedestal drift and things like that, so it is a difficult effect to implement in the MC. For now I would say it is good enough and it is much more important to understand what data will look like when we take into account the pedestal correction that Sasha made, which is NOT in this data I showed today

AC: johan is right, the spread of LAC threshold is dure to T drift evidently. in principle we can correct it, in principle we need individual LAC threshold for individual run and xtal, so we started with correcting with a scaling factor. it is possible to do it anyway

JB: we first want to understand the effect of T correction on the data before making more tuning in the LAC threshold in the simulation

EB: in principle you are correct, but looking at slide 3 you can see there are significant improvements

AC: what is the different between CalTKrXtalRms and CalTransRms?

LL: CalTkrXtalRMs and related (Trunc, TrunE ...) are similar calculation to CalTransRms but using crystals around the track projection in the CAL in a volume that is different for different variables. If you remmeber my study presented last monday at C&A, these are the variables that when stretched caused the highest leakage of background events throught the CALRequirement prefilter in the rejection, so I am particularly pleased that these are back on track. Sasha, what is the plan to monitor the LAC threshold on orbit? how frequently do we plan to calibrate them? or how many different MC runs should we produce with different LAC threshold, that take into account expected temperature variations, to make the bkg rejection cuts immune to these changes?

AC: we will have a dedicated run to calibrate LACs close to launch, then will generate a set of LAC thresholds close to MeV, then we rely on the monitoring program and we will have info for each single orbit. we will measure lac threshold and calibrate them to any nominal value we want, so we do not need to produce different simulations, we just need to correctly calibrate them and monitor them

DP: did you mention this will only work if the 2 thresholds are more or less equal? why?
AC: if difference is too big you just do not see the threshold as it never shows up

BT Analysis memo

MNM: I am concerned that the recent improvements change the hadronic physics list studies
EB: good idea to do this, there should be a section on continuing issues
JB: something to be well understood is that this is not the end of the analysis, but to provide the status to the collaboration
LL: true, but we should refrain from the temptation of writing a 100 pages memo which just collect existing material (very easy to do). we need to provide complete and concise information that could go into a paper, that we need as a reference to support our strategy for calibrating the LAT with extensive use of MC. We can expand an internal memo with more details, but we should not forget we are aiming at a paper. So we will have to redo a lot (if not all) of the studies that are listed here, including hadronic phisycs studies, not sure we can redo everything, but it is important that we reprocess data, generate udpated simulations, rely on existing BtSysTest and analysis to remake the most and finally make the effort to summarize for the benefit of the collaboration and for getting to a paper

EB: about the LPM effect, it is definitely something that we should see, so just disabling it is not good, and as you see from johan's plots it really makes a big effect. is there a way to put pressure on g4 developers to re-implement correctly the LPM effect? do we have any estimate on when this is done?
JB: they work under no pressure, if you really want it, they would say just reimplement it yourself
LL: what was the story with the multiple scattering bug? did we have somebody from our side to reimplement it correctly?
LSR: for the multiple scattering we got back to an old working implementation, I do not think this is possiblefor the LPM, we have no evidence that it ever worked. Johan, there are several effects in the LPM, do you know if G4 people plan to work on all of them?
JB: please send me an email with details and I will fwd it to Vladimir to check about his plans