AX-PET DAQ/Analysis meeting
9/12/09

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Agenda:
Status of measurements Mod2 (bld 304): scan
Results on temperature coefficient $\alpha$
Spatial resolution
Mechanics

Status of measurements Mod2 (bld 304): scan
One last scan on Module 2 is currently ongoing: 50000 evts/run; 26x8 positions (center of WLS, center of crystals on the most external layer); trigger Mod+PMT (including high energy veto on PMT); better temperature control wrt the past scan (10 averaged meas / every 10 sec / slower temp change because of new air conditioning unit).

We will study with this scan:
1) attenuation length for crystals / wls on Mod2
2) reduced effect of the accidentals

Analysis of the temperature coefficient (see slides):
- Long temperature scan, waiting several hours to get stable temperature values.
- At each temperature, the bias was changed according to two different temp coeff (one after the other): $\alpha=0.05$ and $\alpha=0.093$.
- The offline analysis shows clearly that the correct trend is modeled with the correction which uses $\alpha = 0.05$
- Still some open questions: Why do we obtain $\alpha=0.093$ from the study in which we do not correct online for the bias and derive the temperature coefficient from offline analysis? Is it maybe due to the fact that the temperature recorded was not as stable as for the present study?
- Warning: the energy calibration MUST be performed in stable temperature conditions
- Possible option to be considered for the future: Never adjust the bias for the temperature correction, but use the bias at the nominal value (i.e. same PDE) and just correct offline (with $\alpha=5\%$)

Spatial resolution considerations:
Study done (with Mathlab - Werner) to extract the “geometrical” contribution to the RMS in the axial resolution due to the center of gravity algorithm. A source of finite length illuminating the WLS array at different axial positions is considered. The results show that the deviation btw the real position and the position derived from center of gravity is exactly 0 (i.e no deviation) only at the exact center of the WLS and exactly between 2 WLS (i.e. every 1/2 pitch) and this is due to the finite gap between adjacent WLS (0.2 mm).
Complete MC simulations including all the geometry and the correct light propagation effects will be very useful to estimate the ‘expected’ RMS in the z-reco distribution (center of gravity)

Mechanics:
- The mechanics with the 2 modules one in front of the other (d=15 cm) will be ready by Fri 11th Dec
- The motors will allow movements in y and z (as before with single module)
- The source will be positioned btw the 2 modules at the center (with the possibility to be moved with 1cm pitch)
- With low priority: prepare the arm for a possible scan Module + tagger-PMT keeping the two modules at the present distance of 15 cm