LArSoft minutes, 20-Apr-2011. -- Eric Church

LArSoft minutes appear at https://cdcvs.fnal.gov/redmine/projects/activity/larsoftsvn. (The location presumably at which you found these!) For further details of matters reported here drill down into the wiki, etc, at that redmine site. Everyone is welcome to attend the bi-weekly meetings. Next meeting will be 5-May-2011. It will be phone-in only. mu2e review is taking all the good video rooms.

There is a pdf on the documents link of the redmine site for today by BJPJones, Lee, Eric. Click Documents, sort by Date.

System update: We're now on ARTv0.06.03 release. The cutover to v06 went painlessly and happily without meeting any of the issues which raised a certain amount of furor last meeting. All produce methods now need a reconfigure() method, called from the constructor to suck in pset parameters and which allows for EVD to reconfig on the fly. Everyone, please comply. Externals will soon be found at /nusoft/app/externals... instead of /grid/fermiapp/XXX. Already the LArSoft installs have been taken down from /grid/fermiapp/ubooone,argoneut/code/larsoft and only live now at /grid/fermiapp/lbne/lar/code/larsoft. All this is for ease of maintenance. There's no reason to maintain redundant builds.

Roxanne and Georgia have hit the 2 TB quota, now upped to 7 TB by Lee Lueking, at /uboone/data/mc. Ridonculous. We need to be sure we are not writing empty events to the record, which are non-Null in size.

BjpJones discussed the simplified way in which Birk's law is currently implemented in DriftElectrons -- MC only here, of course. This is to take account of recombination. In a nutshell, the dx in dE/dx, is taken to be voxelSize, for which the default is 0.3mm. In fact, of course, tracks don't always go down the axis of our cubic voxels. So, it's a geometry problem Ben's investigating. He wrote a toy MC outside of LArSoft to study this. He adopts a simple constant dE/dx model to start. The problem is most glaring for high energy, large dE/dx particles. For muons it's at worst a couple%, and that's toward the end of their tracks. Ben then deposits energy/charge per a Bethe-Bloch distn. Low energy protons (40-50MeV) give a 5% effect and it decreases to 1% after 250MeV. Looking at the per-voxel, not integrated-along-the-track, discrepancies, the problem is worst in the low energy tracks, low charge bins, where the true and approximate number of voxels hit are pretty different. "Effects on clustering etc may be nontrivial. Efficiencies etc derived from monte carlo cannot be applied to data for non-MIPs, without a detailed study of these sort of effects." There are two fixes evident, Ben points out. One solution is to keep track of the true track length with each voxel energy insertion. When two particles cross the same voxel this gets tricky, perhaps.The other direction we could go, Brian reminds and as Bruce said a few meetings back, is to ditch the whole LArG4/DriftElectrons package separation and combine those steps.

Eric briefly described the Kalman track fitter progress. It was a quick summary of a correction he made since the uBooNE PAWG meeting, in which he presented reconstructed angles wrt the beam for 1.5 GeV/c muons. Those were largely far from the MC truth value. In fact, subsequent studies showed the tracks fit the spacepoints as given just fine. Problem is the spacepoints were wonky, coming out of Track3Dreco. That code is very ArgoNeuT specific, and his efforts to

make it work for uBooNE failed. Eric then moves on to ArgoNeuT and uses a far more generic new module called SpacePts (also still ArgoNeuty) to produce the spacepoints, and Track3DKalman works great. See his plots. He'll try Josh's suggestion to run the houghcluster module before the spacepoints next. Eric'd really like to make this work in uBooNe, which awaits check-ins and work by Herb Greenlee (work reported in this space) and/or Mitch, both of whom are working on detector-generic spacepoint-finding modules.

Herb showed a nice presentation of pairing hits on all three uBooNE MC planes. He uses only raw hits from GENIE neutrino events and looks for spacepoint combinations over all three planes. No clustering used yet, though he mentioned he did something to get the combinatoric bgd down from the start. Not sure what that was. In general with three planes, there are three constraints, namely the two independent pairs of times must be close to matched and there's a space constraint which basically says the sum over i of wire number for plane_i times the sin (wireangle_plane_i-wireangle_plane_i+1) must sum to zero, up to a constant due to wire numbering scheme. "There is no hope of reconstructing space points before clustering from two views for an event that is more complicated than a single track. There is some hope of reconstructing space points before clustering from three views." Herb shows how tightening the first pair of constraints and the space constraint separately yields an ever tighter peak in the other variable. Herb advocated for an EVD that lines the time up on the three planes so as to be able to see hits in time coincidence. (By the end of the today, Brian had implemented that.) Herb will try using dbscan to throw out noise hits and hopefully get the combinatoric bgd down further. He notes the efficacy of Track3Dreco's use of cluster end point hits too, and he may go down the road of applying a constraint based on that idea. He was urged to check in whatever spacepoint finding code he has into TrackFinder. Eric's simple version SpacePts is recently ci'd. Mitch has a preliminary spacepoint finding in LArTracker.

See ya at the next LArSoft mtg in the Racetrack, 7th floor on 5/4, Wed, 9am CST.

Details for the next meeting:

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>>> video: 85LARSW
>>> phone: 510 883 7860 (ID 85LARSW)
>>> fnal location: Racetrack, 7th floor x-over
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