Status report
- and lots of questions...

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Outline

• Background normalization computation... remaining questions.

• Oscillation analysis some questions as well.

• SK-II MC
Background computation

From Okumura-san's I know that:
* normalize to 1Mtonx1yr event spectrum (from nunokawa-table)
  * kam nue 37148.4 ev/1Mton/1yr (0-1.5GeV)
  * kam nueb 10874.8 ev/1Mton/1yr (0-1.5GeV)
  * korea nue 2932.3 ev/1Mton/1yr (0-1.5GeV)
  * korea nueb 858.4 ev/1Mton/1yr (0-1.5GeV)

Nakayama-san and his answer was:
* 0.27Mton*yr (with 4MW beam) at Kamioka.
* The numbers of single-ring mu-like events with
  * 0.2-1.5 GeV neutrino energy are
  * nu beam : 8144.65
  * anti-nu beam : 3143.31.
which are basically the same once I renormalize to 1Mton.

Question: Am I wrong to think I need two different sets of numbers? I think I am wrong but.......
What to do then?

So far, my likelihood is defined as:

1. **Events who pass every cuts (4 precuts + likelihood)**
2. **Events who pass all precuts (FCFV, e-like, 1-ring, no decay_e)**

If I want to use the normalization stated before then the likelihood efficiency must be:

1. **Events who pass every cuts (4 precuts + likelihood)**
2. **All single-ring events (FCFV? no decay_e?)**

**Question:** Right?

**What about FCFV and no decay_e?**
Nakayama-san gives e-like and mu-like events numbers.

Question: Can I use the e-like number and use the previous definition of my likelihood efficiency?
Oscillation analysis

• I modified every scripts and kumac in order to do the off-angle analysis (rename file_oa.sh or file_oa.kumac)

Question: Which value of dm, and distance should I use? distance = 1050km? dm=2.5?

• Everything seems to be working fine. (I started even if my background spectrum was wrong just to check that the tools were working and to know how much time I needed)

• One step (loop_fraction.sh) seems to take long (around 8h)

Question: Is any other step time consuming or is it the only one?
In order to do a study of 20% pmt coverage vs. 40% pmt coverage, I used SK-II ATM MC and computed the likelihood efficiency.

All plots are located at http://hep.bu.edu/~fdufour/t2kk in official plots.

But here are some of them:

NB: in order to improve the SK-II likelihood, some of the binning should be changed, but I will not do it now, since it would be time consuming.
Ring counting parameter:

SK-I

SK-II

SK-II probably better after rebinning
Polfit Likelihood parameter:

SK-I

SK-II
Likelihood results:

SK-I

Likelihood

100-250 MeV

250-400 MeV

400-600 MeV

600-900 MeV

900-1500 MeV

1500- MeV

SK-II
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<th>Rec Enu</th>
<th>0~0.35</th>
<th>0.35~0.85</th>
<th>0.85~1.5</th>
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<td>Nu-mu CC</td>
<td>efficiency</td>
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<td>30.4%</td>
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<td>Nu-mu CC</td>
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<td>84.8%</td>
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<td>73.6%</td>
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