Weekly senior thesis update

Monday T2K SBU Meeting
Feb 18, 2013
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News

• I got 2 more offers!
NOvA spectra

• Changed some things in the GLoBES script.
  – Now use rule to get rates (0 for nue appearance, 2 for numu disappearance)

• Output to text, then read into ROOT files paired with oscillation parameters.
Sample NOvA spectrum (NH)

- $\sin^2(\theta_{13})=0.024$
- $\sin^2(\theta_{23})=0.5$
- $\Delta m^2_{32}=2.42\times10^{-3}$ eV$^2$
Sample NOvA spectrum (IH)

- $\sin^2(\theta_{13}) = 0.024$
- $\sin^2(\theta_{23}) = 0.5$
- $\Delta m^2_{32} = -2.42 \times 10^{-3} \text{ eV}^2$
Recalculate $\Delta \chi^2$

- Calculate $\chi^2$:
  $$\chi^2_{\text{nova}} = -2 \ln P(\nu_e; n_{\text{exp}}, n_{\text{obs}}) - 2 \ln P(\nu_\mu; n_{\text{exp}}, n_{\text{obs}})$$
  - Based on Poisson statistics, assuming NH then IH

- Combine T2K and NOvA in calculating $\Delta \chi^2$:
  $$\Delta \chi^2 = <\chi^2_{IH,T2K} - \chi^2_{NH,T2K} > + <\chi^2_{IH,nova} - \chi^2_{NH,nova} >$$

- Coding in progress, mostly finished.
  - On track to finish calculation by meeting with James this week
From here

• Calculate metrics

• Begin to plan/write the actual thesis
  – Final draft due by last day of class (mid May)
  – Outline should be ready by meeting with James