

MINOS

2012 Highlights



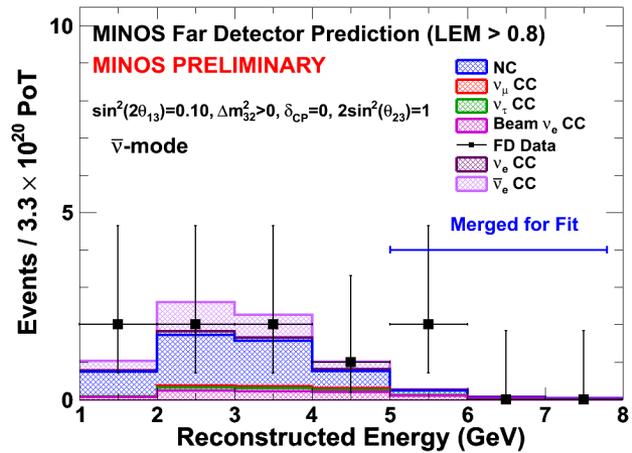
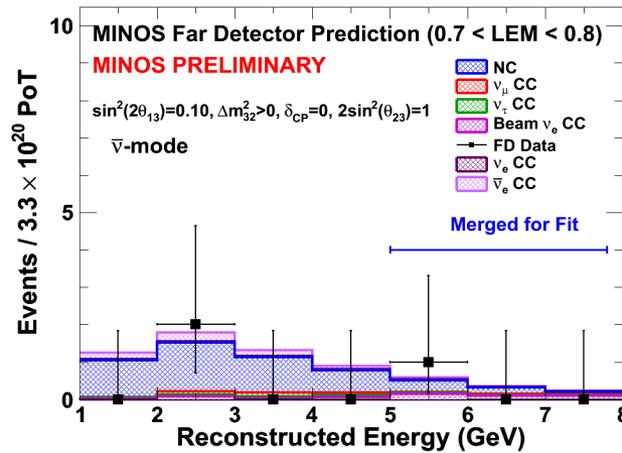
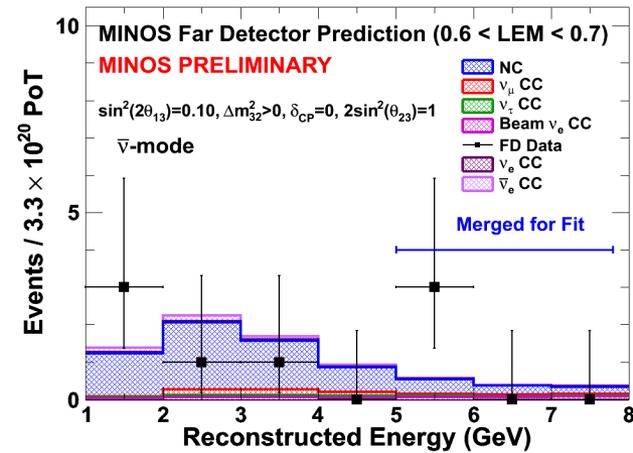
This presentation can be found at
http://www-numi.fnal.gov/pr_plots/index.html



Results on appearance of electron-antineutrinos with 3.3×10^{20} POT $\bar{\nu}$ mode running

| Candidate Event Yields | |
|------------------------|-------------------------------|
| LEM > 0.6: | Observed: 20 |
| | Predicted: 17.5 bkg + 3.7 sig |
| LEM > 0.7: | Observed: 12 |
| | Predicted: 10.5 bkg + 3.1 sig |

Prediction assuming $\sin^2(2\theta_{13})=0.1, \delta=0, \Delta m^2 > 0$



The reconstructed energy spectrum of the selected candidate events divided into three samples according to the LEM selection variable. Note we are unable to distinguish between $\bar{\nu}_e + \nu_e$ events, so the selected events include a combined sample of $\bar{\nu}_e + \nu_e$ events.

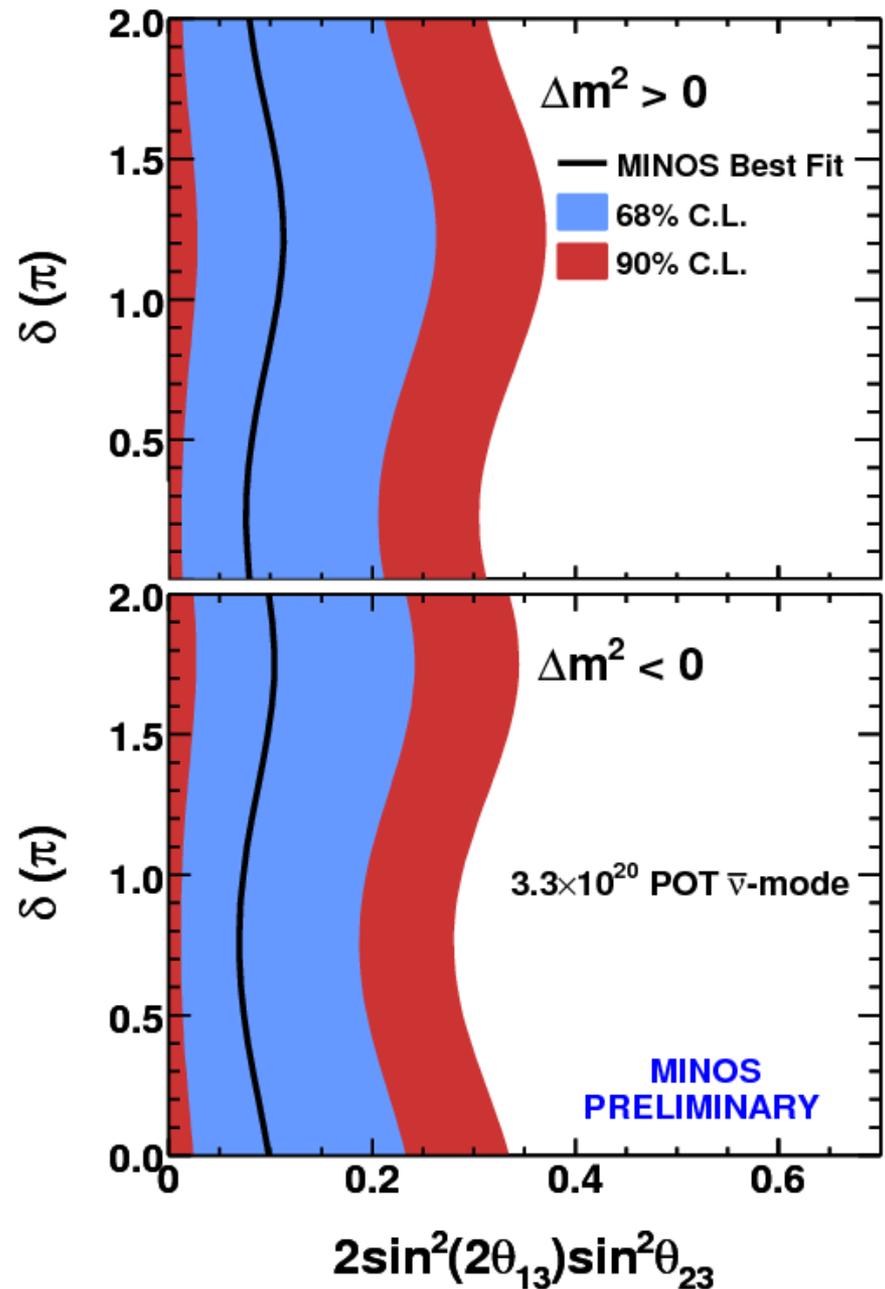
A search for appearance in data taken in the $\bar{\nu}$ mode is performed by fitting these 15 bins to various background+oscillation hypotheses.



Results on appearance of electron-antineutrinos with 3.3×10^{20} POT $\bar{\nu}$ mode running

Exclusion limits based on the selected candidate event distribution in $\bar{\nu}$ mode running.

Allowed values are in the colored regions



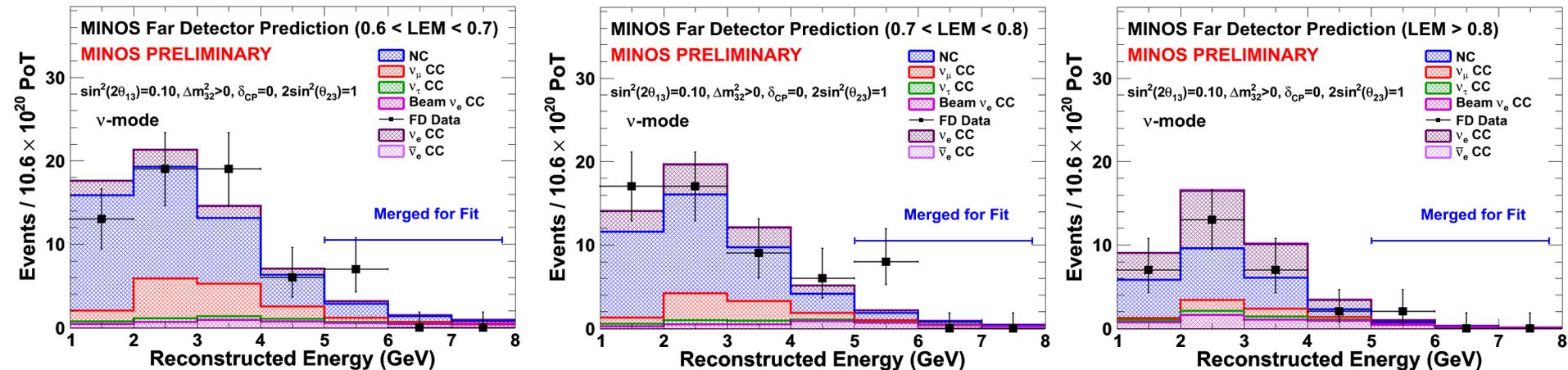


Results on appearance of electron-neutrinos with 10.6×10^{20} POT ν mode running

Candidate Event Yields

| | | |
|------------|------------|----------------------|
| LEM > 0.6: | Observed: | 152 |
| | Predicted: | 128.6 bkg + 32.5 sig |
| LEM > 0.7: | Observed: | 88 |
| | Predicted: | 69.1 bkg + 26.0 sig |

Prediction assuming $\sin^2(2\theta_{13})=0.1, \delta=0, \Delta m^2 > 0$



The reconstructed energy spectrum of the selected candidate events divided into three samples according to the LEM selection variable. Note we are unable to distinguish between $\bar{\nu}_e + \nu_e$ events, so the selected events include a combined sample of $\bar{\nu}_e + \nu_e$ events.

A search for appearance in data taken in the $\bar{\nu}$ mode is performed by fitting these 15 bins to various background+oscillation hypotheses.

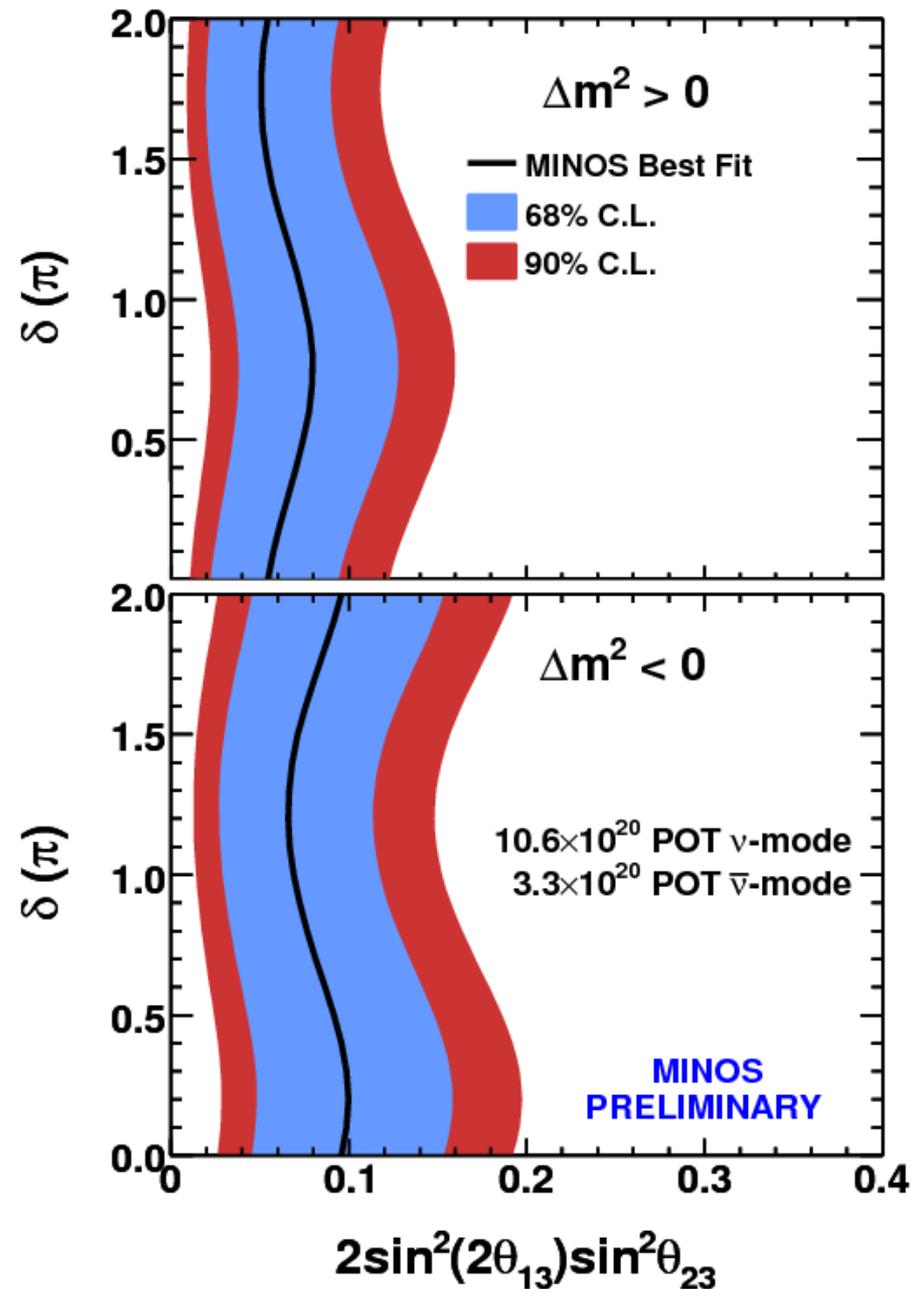


Results on appearance of electron-(anti)neutrinos with 3.3×10^{20} POT

$\bar{\nu}$ mode running and 10.6×10^{20} POT
 ν mode running

Exclusion limits based on the selected candidate event distributions for both $\bar{\nu}$ mode running and ν mode running.

Allowed values are in the colored regions



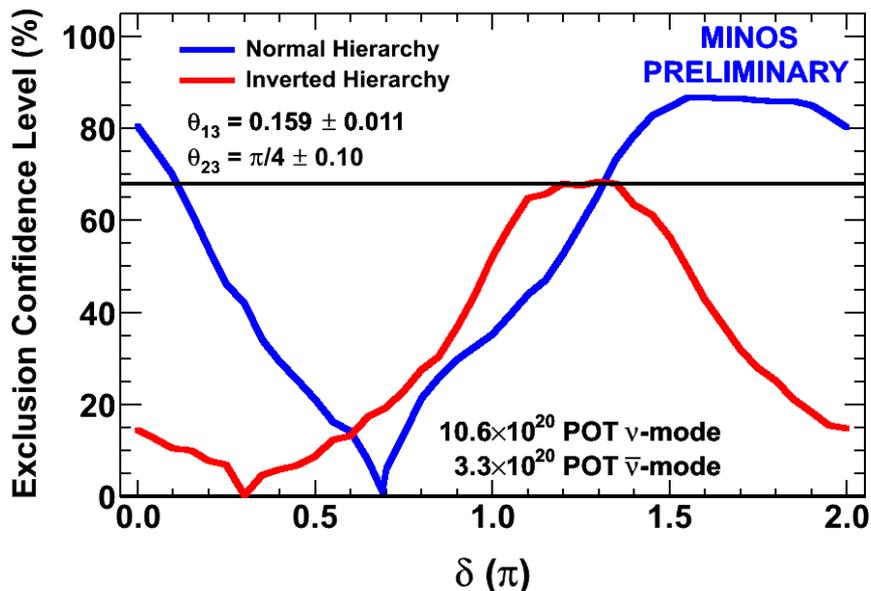


Results on appearance of electron-(anti)neutrinos with 3.3×10^{20} POT

$\bar{\nu}$ mode running and

10.6×10^{20} POT

ν mode running



The confidence level at which we can exclude combinations of delta and the mass hierarchy based on a combined fit of the neutrino and antineutrino data sets.

This analysis was done using the Feldman-Cousins method. Pseudo-experiments were generated, varying all the mixing angles and mass square differences within their uncertainties. We use the uncertainty for θ_{13} from the combination of Daya Bay+RENO+Double Chooz measurements.

The horizontal line indicates 68% CL. Points above this line are excluded at the 68% CL by our data. The value at which the exclusion CL is 0% is our best fit value of delta, which depends on the hierarchy.