CC analysis improvements

Since our previous result, MINOS has doubled its dataset

- **$3.4 \times 10^{20} \rightarrow 7.2 \times 10^{20}$ POT**

We are also incorporating analysis improvements

Adding in events with poorly measured charge

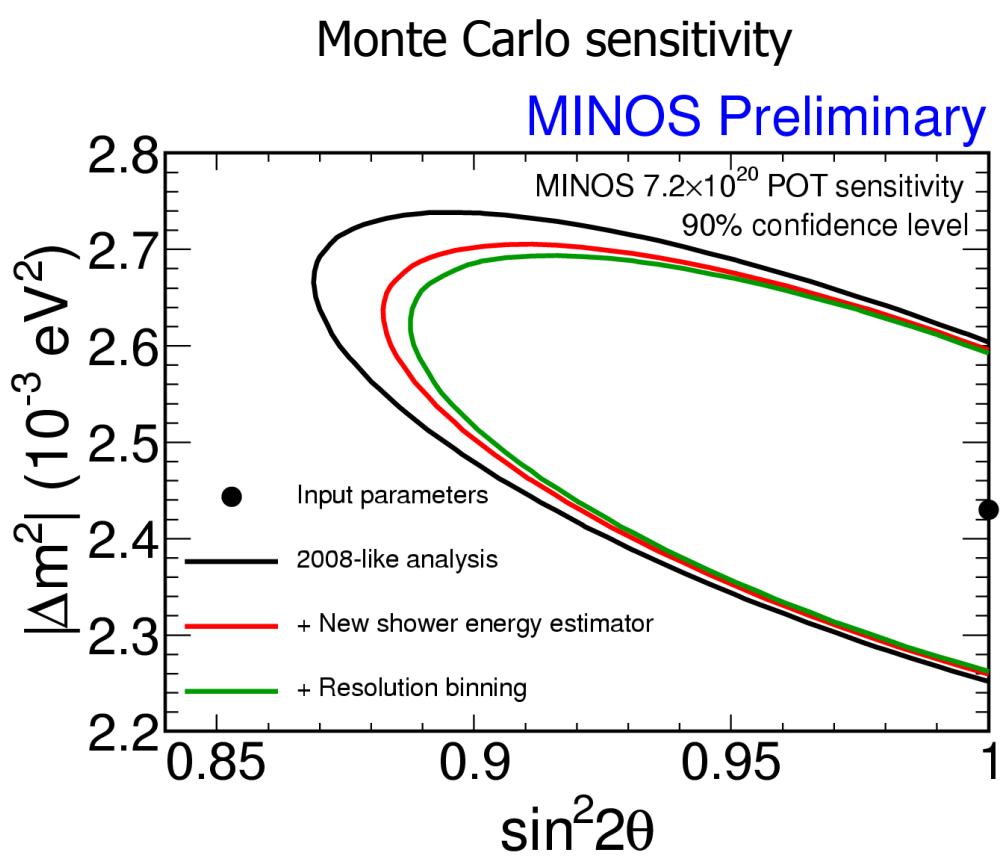
- **Recovers around half the events at low energy**

A new selection variable optimized for low energies

Grouping events according to their resolution

New hadronic shower energy estimator

- **Based on a k-nearest-neighbour technique**
- **Significantly improves shower energy resolution**



CC Neutrino Results

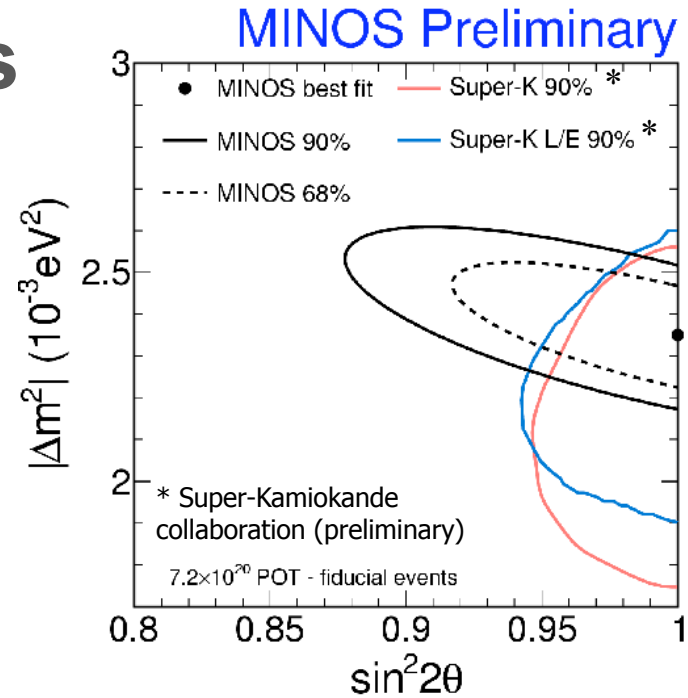
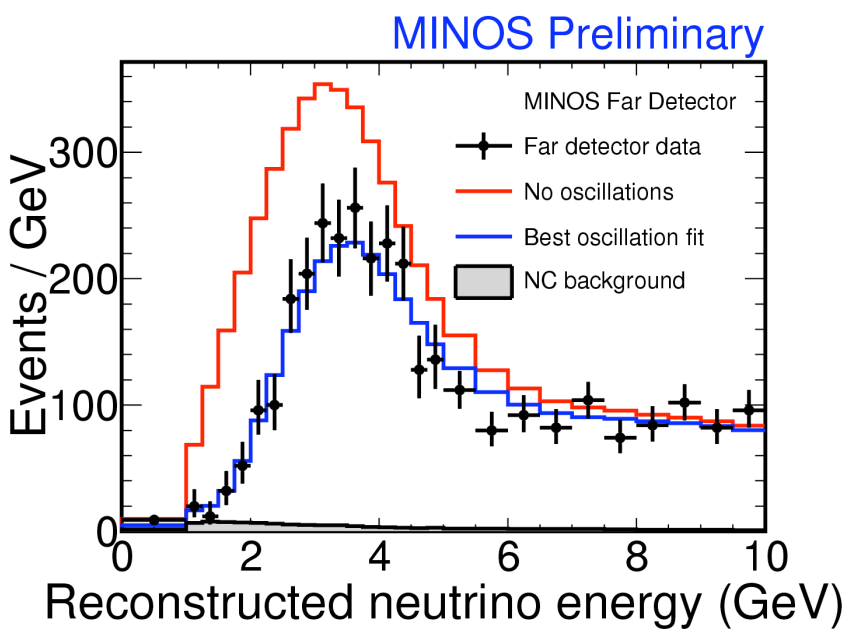
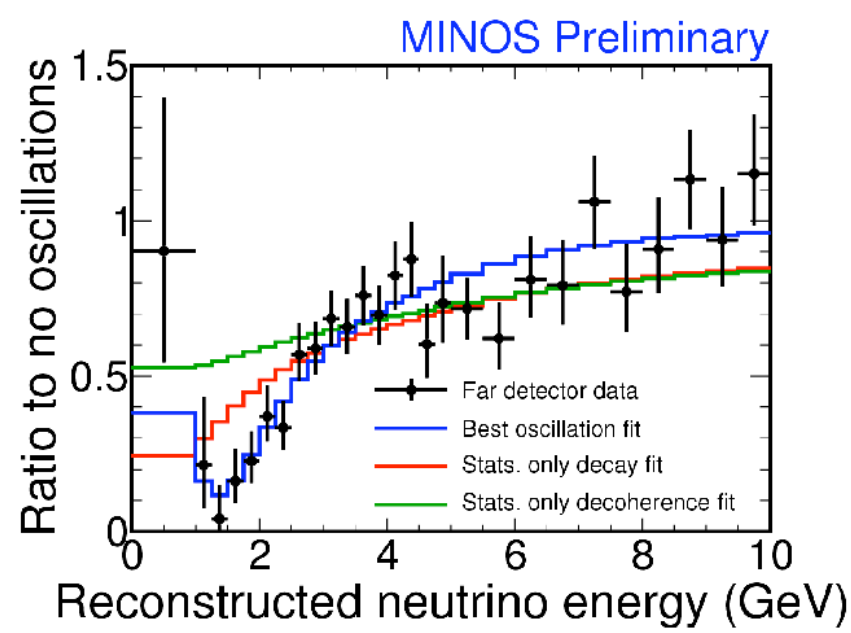
$$\left|\Delta m^2\right| = 2.35^{+0.11}_{-0.08} \times 10^{-3}\,\mathrm{eV}^2$$

$$\sin^2(2\theta) > 0.91\ (90\%\ \mathrm{C.L.})$$

No oscillations: predict 2451 events

Observe 1986 events

Pure decoherence disfavoured at > 8σ

Pure decay disfavoured at >6σ

- **7.8σ if NC events included**