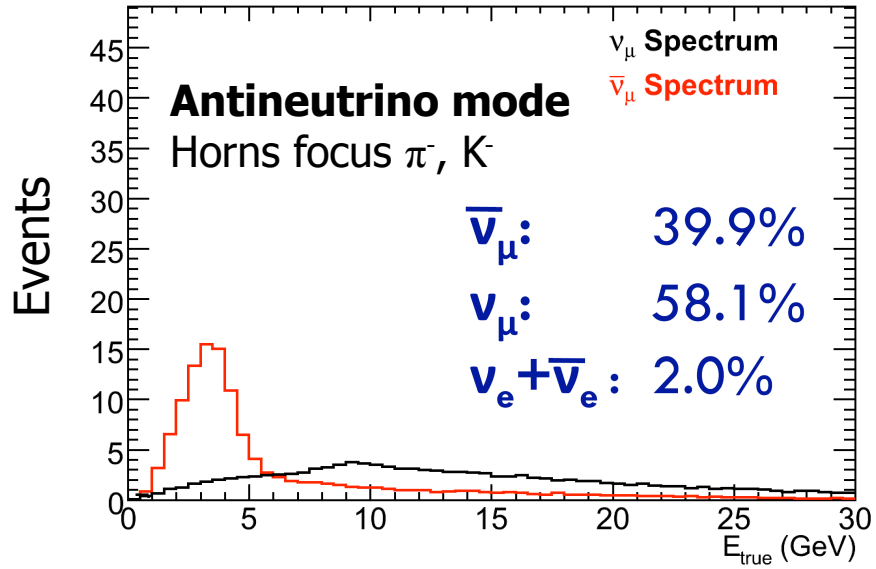
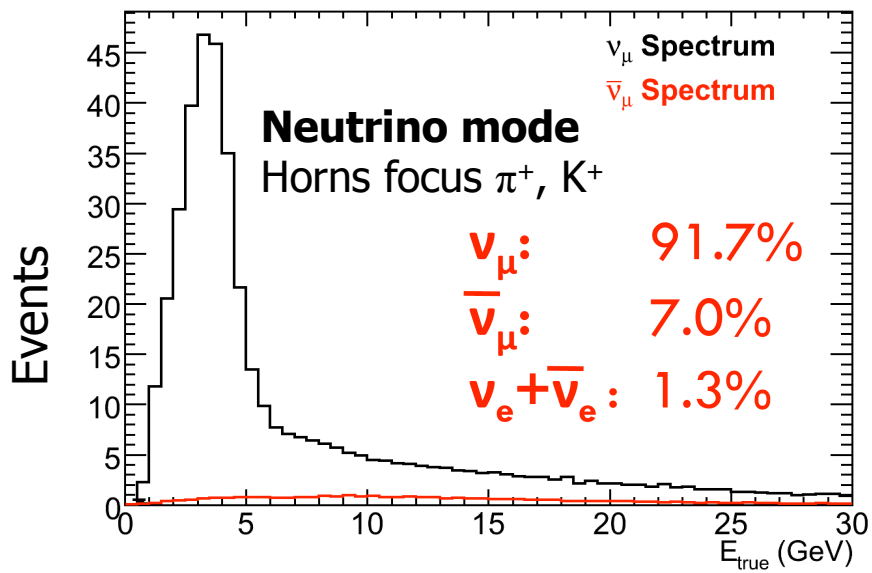
Antineutrino running





MINOS has taken six months of data with a dedicated $\bar{\nu}_\mu$ beam

- **Allows the first direct precision measurement of the muon antineutrino oscillation parameters**

To obtain a pure CC-$\bar{\nu}_\mu$ sample, apply two selection cuts

- **Charge of selected muon track**
- **k-nearest-neighbour-based selection variable to separate out NC events**

Final sample purity is 98% below 6 GeV

Antineutrino results

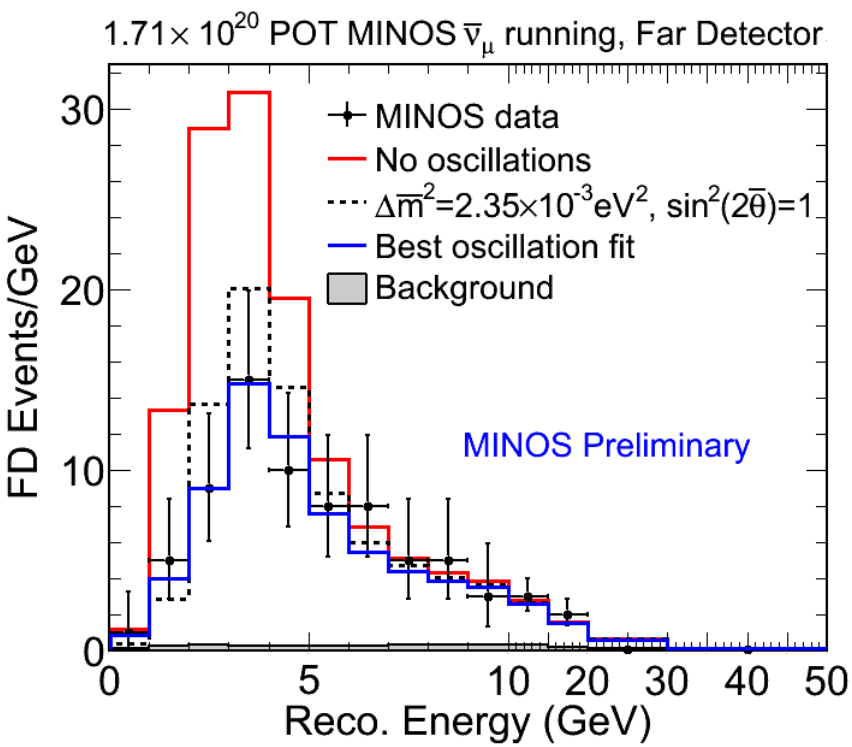
Expect 155 events with no oscillations

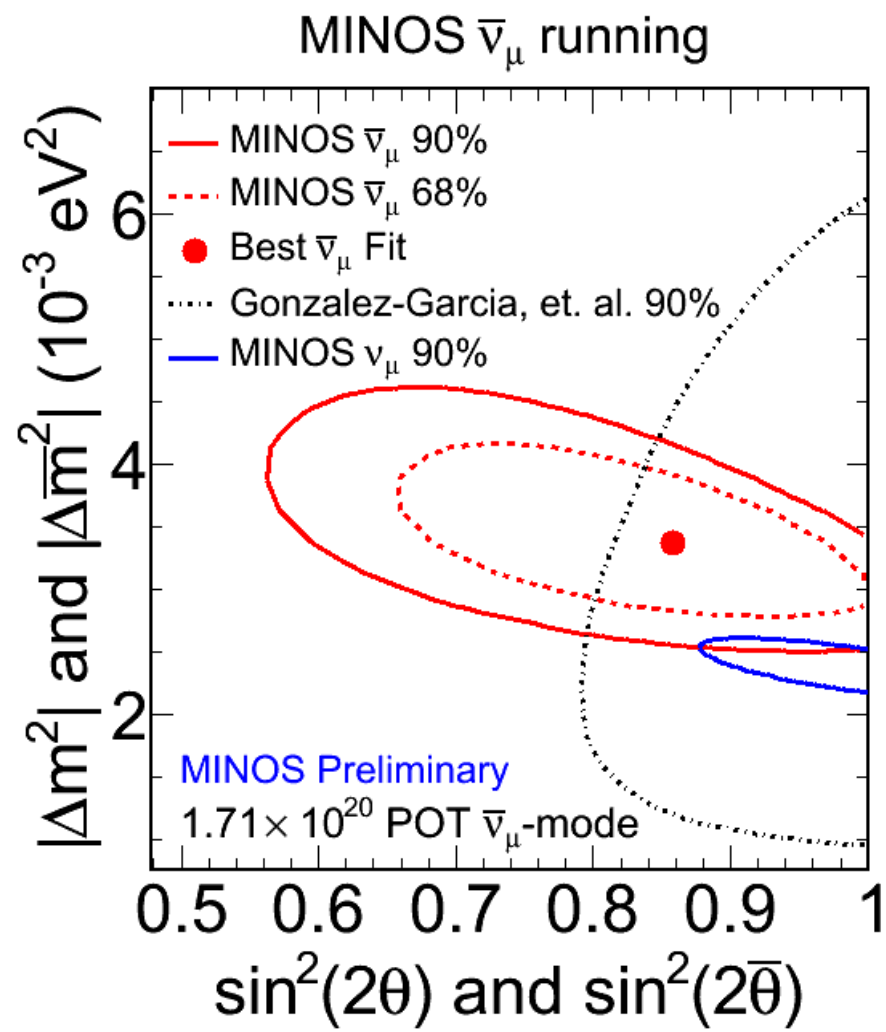
Observe 97 events

- **No oscillations disfavoured at 6.3σ**

Best fit to oscillations:

$$\left|\Delta\bar{m}^2_{\rm atm}\right| = 3.36^{+0.45}_{-0.40}({\rm stat}) \pm 0.06({\rm syst}) \times 10^{-3} eV^2$$
$$\sin^2\left(2\bar{\theta}_{23}\right) = 0.86 \pm 0.11({\rm stat}) \pm 0.01({\rm syst})$$





Global fit from Gonzalez-Garcia & Maltoni, *Phys. Rept.* 460 (2008), SK data dominates