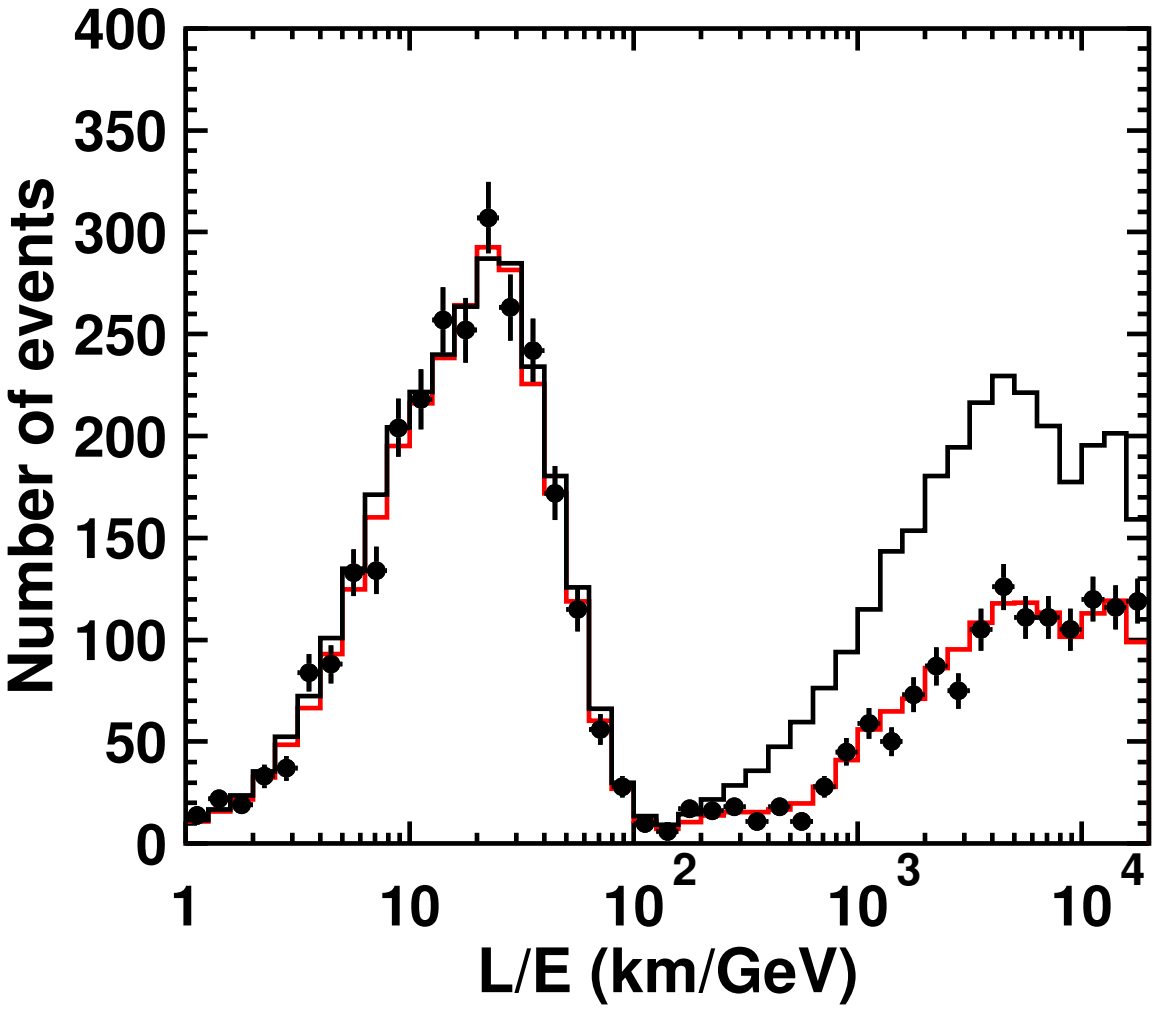
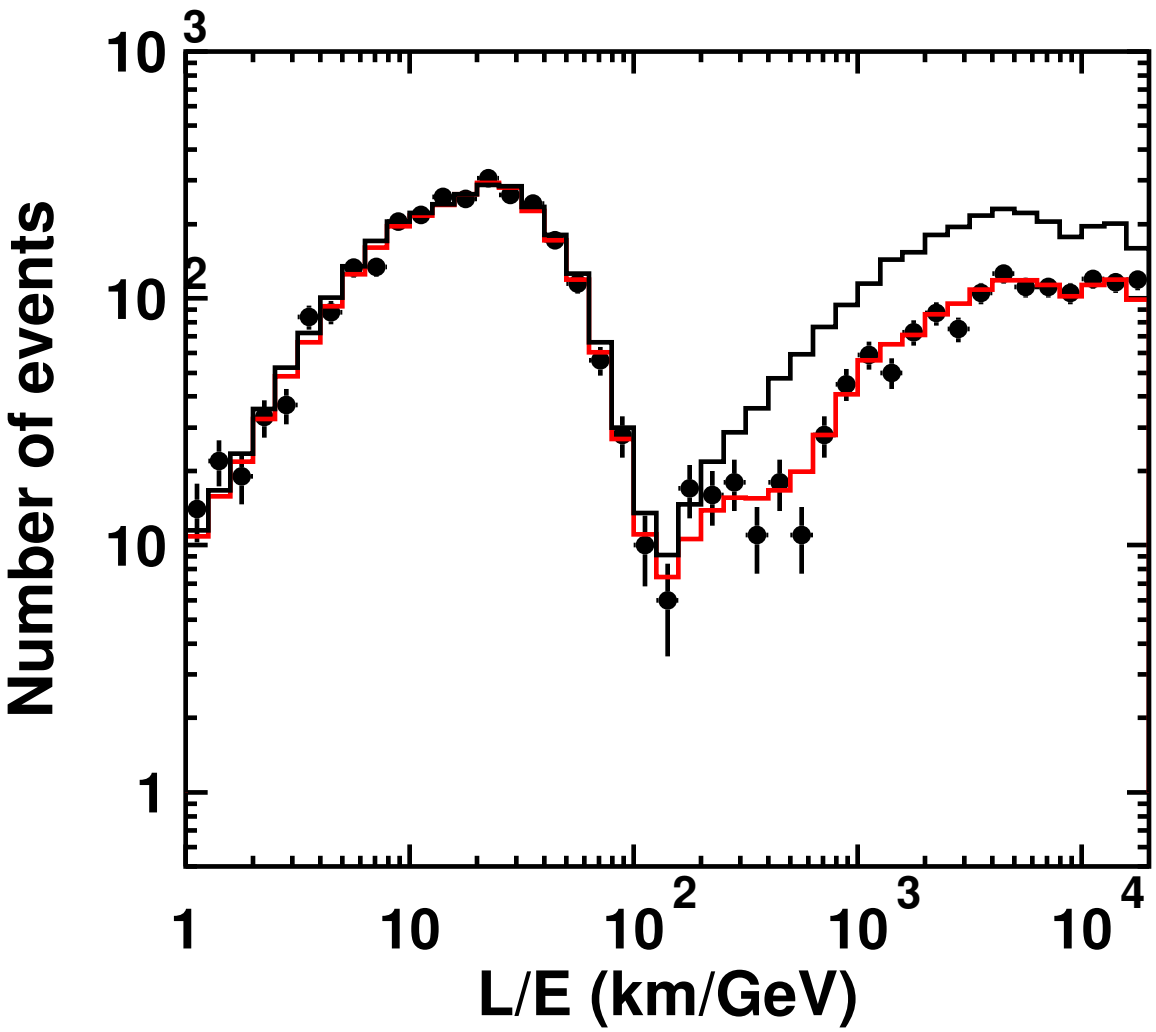
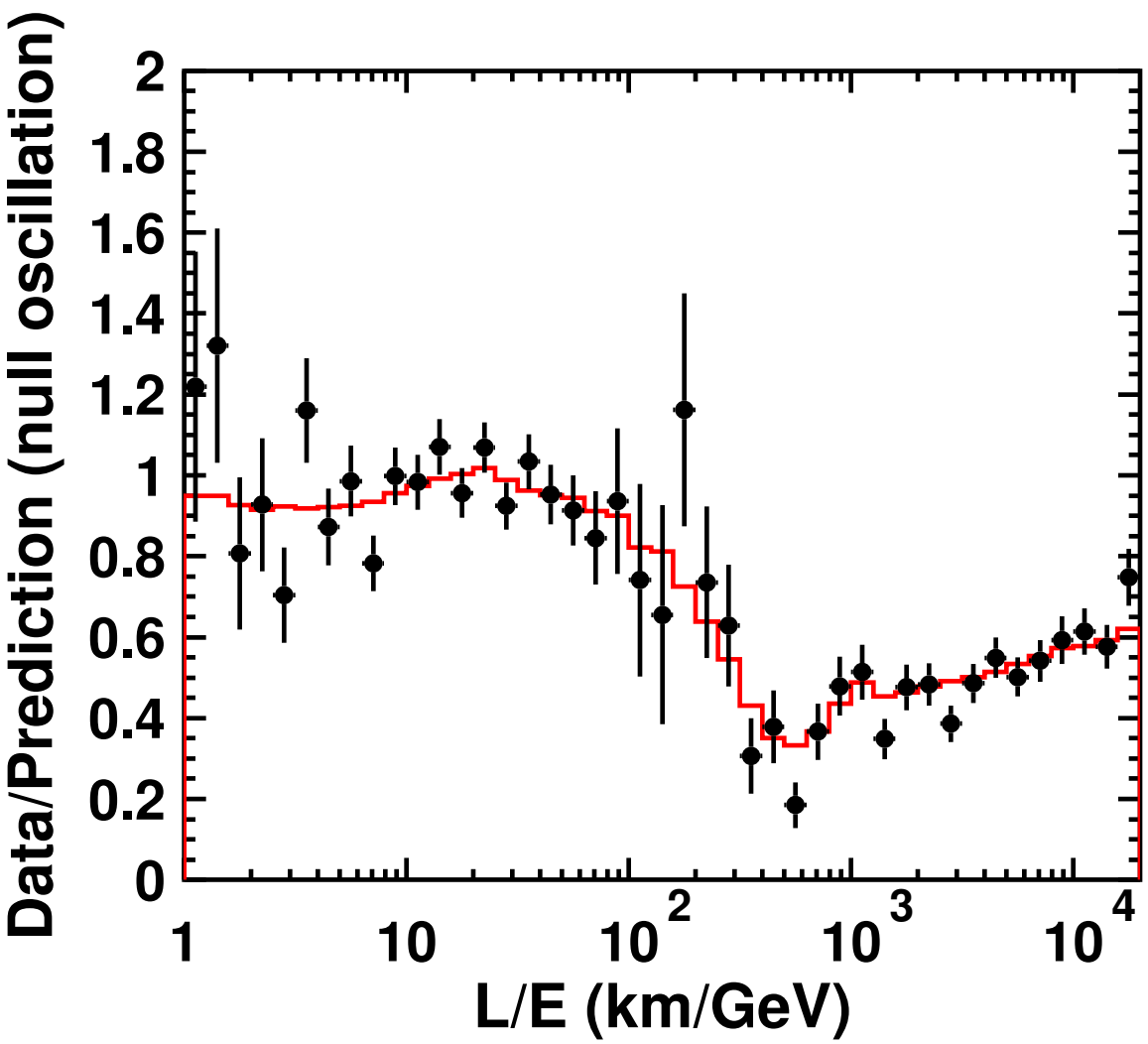
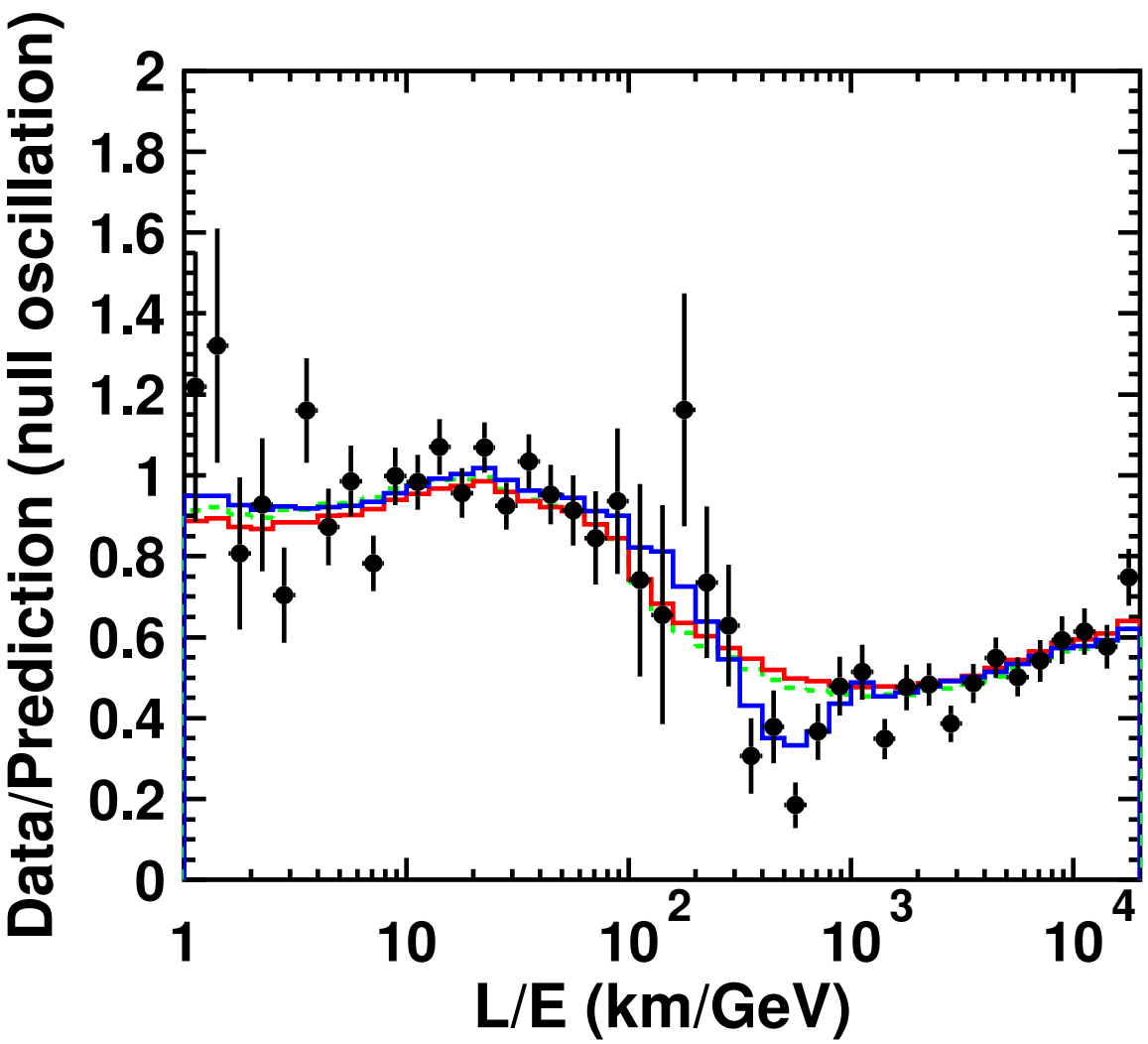
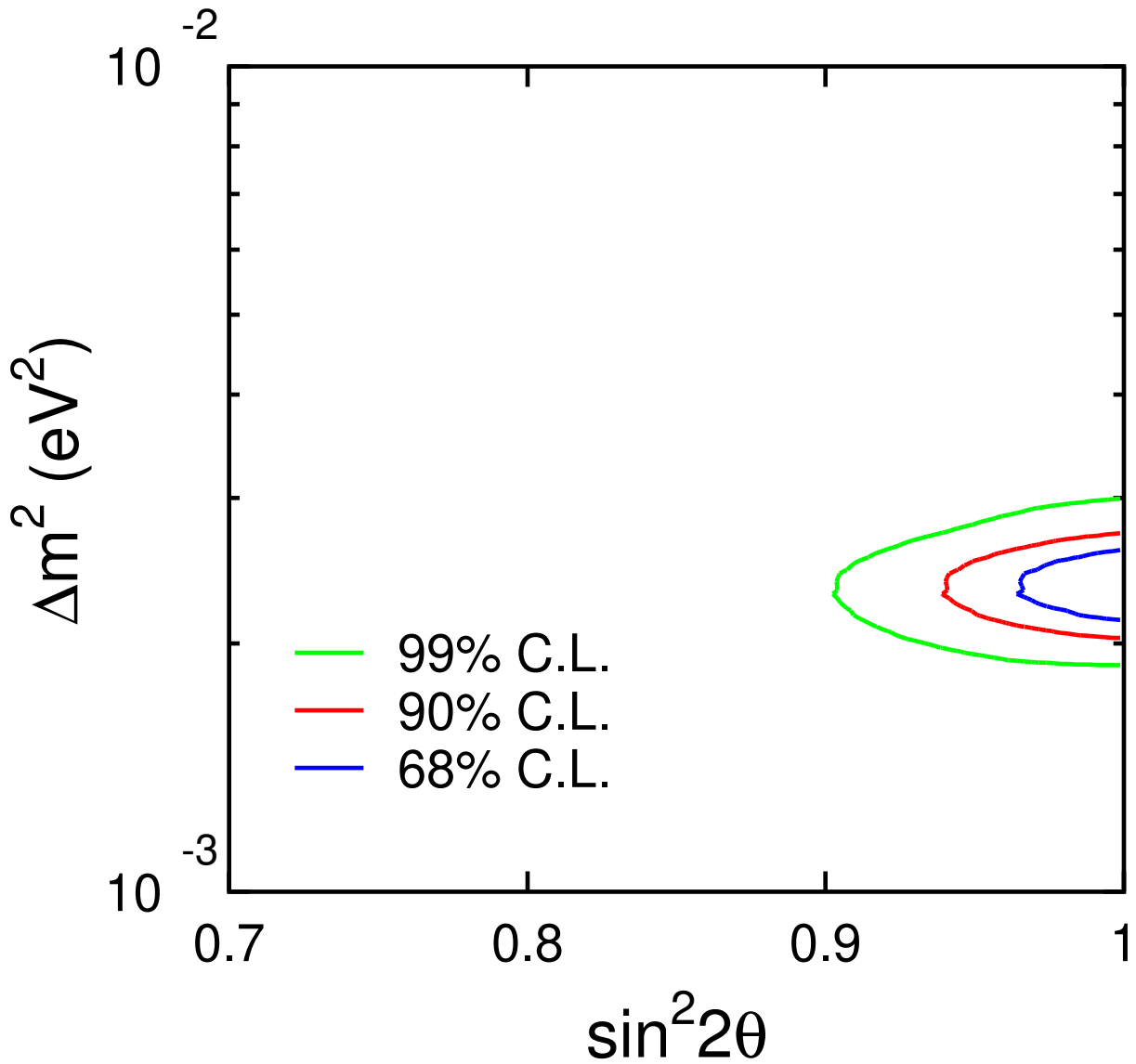
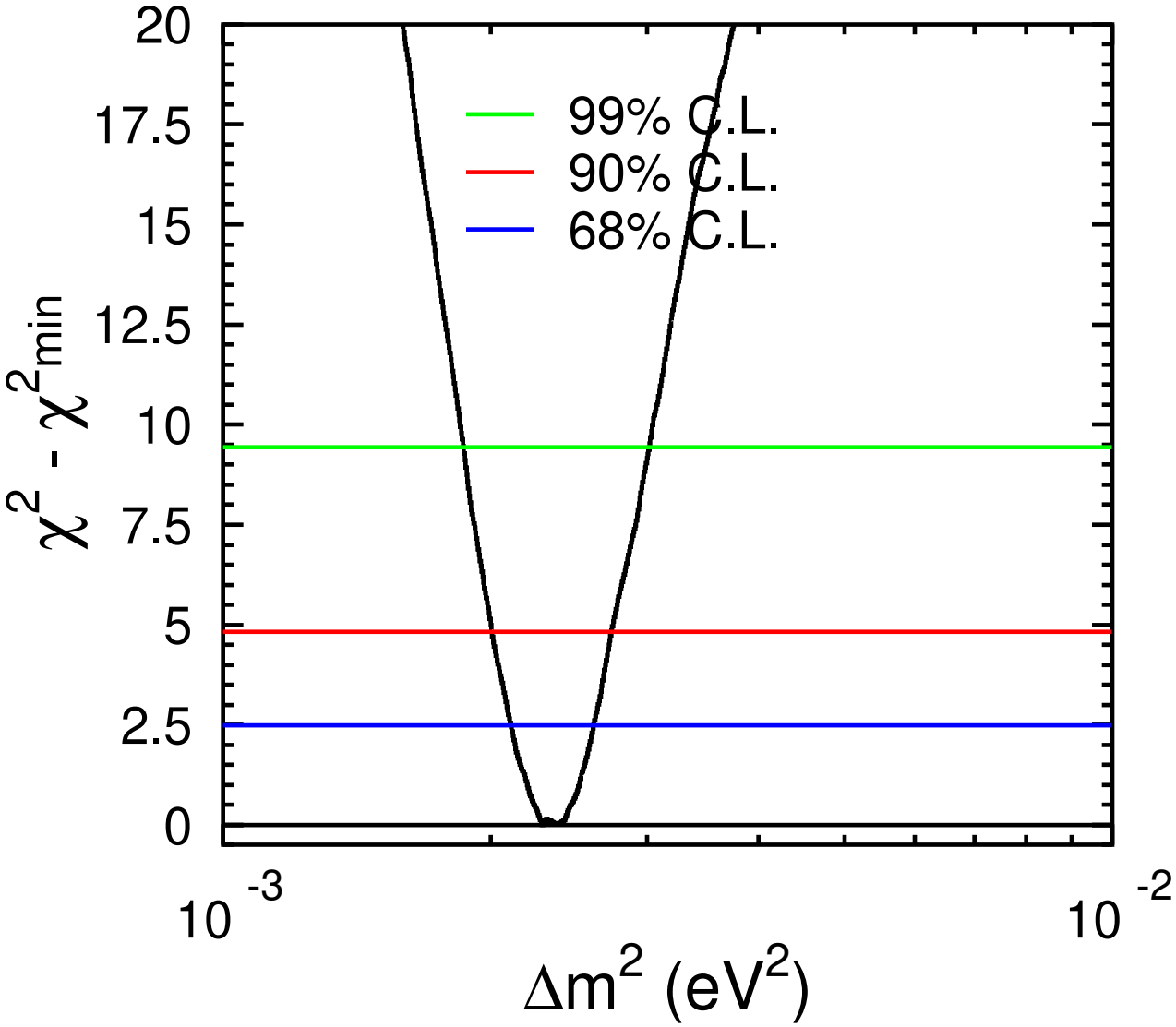

Number of events
400
350
300
250
200
150
100
50
0
1
10
10^2
10^3
10^4
L/E (km/GeV)

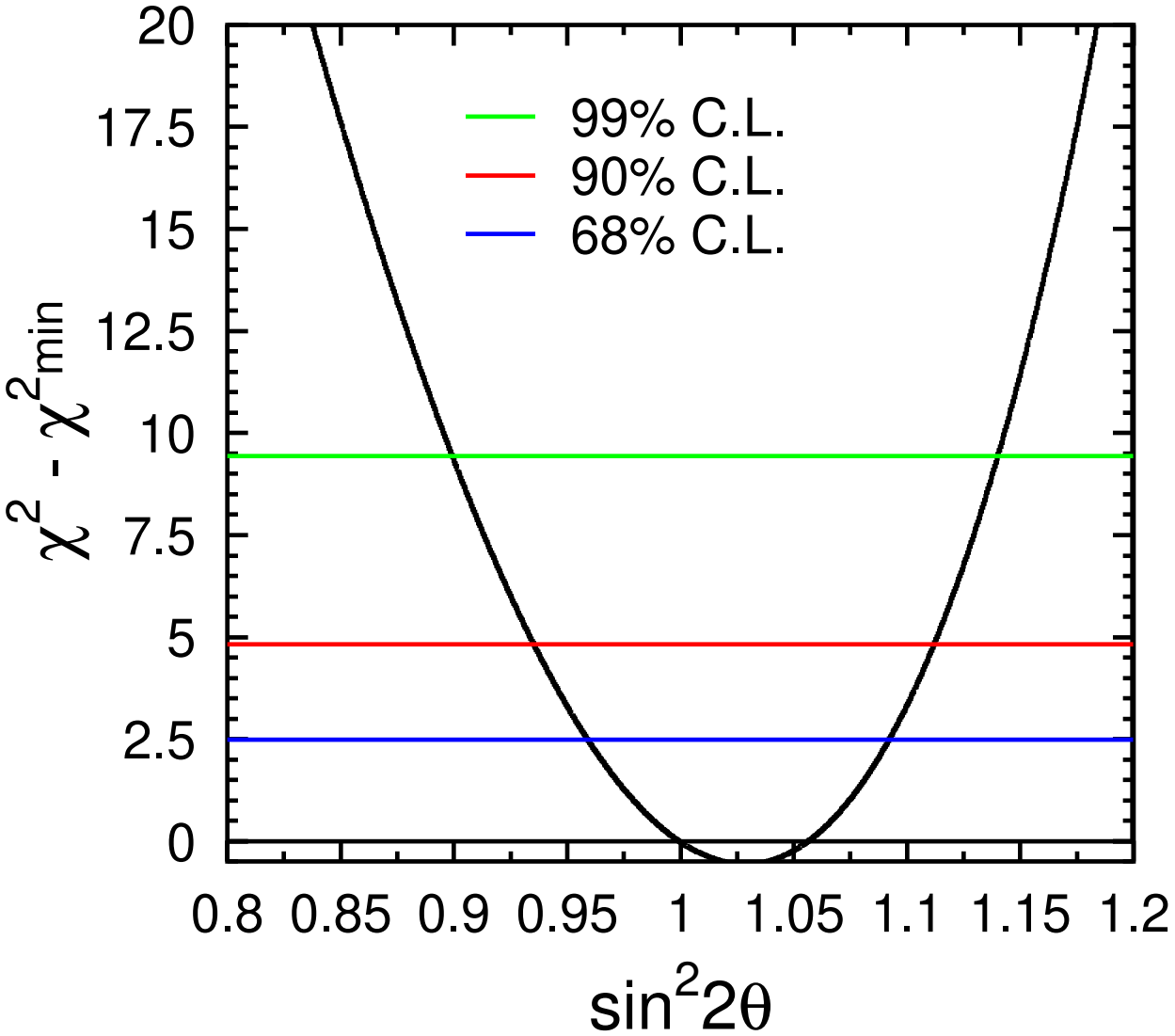

Number of events
L/E (km/GeV)
10 3
10 2
10
1
1
10
10 2
10 3
10 4


Data/Prediction (null oscillation)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
10
10^2
10^3
10^4
L/E (km/GeV)


Data/Prediction (null oscillation)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
10
10^2
10^3
10^4
L/E (km/GeV)


10^-2
10^-3
0.7
0.8
0.9
1
Δm^2 (eV^2)
sin^2 2θ
99% C.L.
90% C.L.
68% C.L.


20
17.5
15
12.5
10
7.5
5
2.5
0
$\chi^2 - \chi^2_{min}$
99% C.L.
90% C.L.
68% C.L.
10^{-3}
10^{-2}
Δm^2 (eV^2)


20
17.5
15
12.5
10
7.5
5
2.5
0
$\chi^2 - \chi^2_{min}$
99% C.L.
90% C.L.
68% C.L.
0.8
0.85
0.9
0.95
1
1.05
1.1
1.15
1.2
$\sin^2 2\theta$

Results of L/E Analysis
(SK-I(1489) + SK-II(804) days)

- **Assuming $\nu_\mu \leftrightarrow \nu_\tau$ Oscillation**

  Best Fit:

  χ^{2}_{min} = 83.9 / 83 d.o.f

  at ($\sin^2 2\theta$, Δm^2) = (1.00 , 2.3×10^{-3} eV^2)

  (including unphysical region)

  χ^{2}_{min} = 83.4 / 83 d.o.f

  at ($\sin^2 2\theta$, Δm^2) = (1.03 , 2.4×10^{-3} eV^2)

  90% confidence level allowed region:

  $\sin^2(2\theta) > 0.93$

  $2.0 \times 10^{-3}\ eV^2 < \Delta m^2 < 2.8 \times 10^{-3}\ eV^2$

  68% confidence level allowed region:

  $\sin^2(2\theta) > 0.96$

  $2.1 \times 10^{-3}\ eV^2 < \Delta m^2 < 2.7 \times 10^{-3}\ eV^2$

- **Assuming Neutrino Decay**

  χ^{2}_{min} = 107.1 / 83 d.o.f

  $\Delta\chi^2$ = 23.2 / 83 d.o.f (4.8 standard deviations)

- **Assuming Neutrino Decoherence**

  χ^{2}_{min} = 112.5 / 83 d.o.f

  $\Delta\chi^2$ = 27.6 / 83 d.o.f (5.3 standard deviations)