
MiniBooNE error analysis

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Clear up some points from last meeting

→ MiniBooNE neutrino mode running was systematic limited

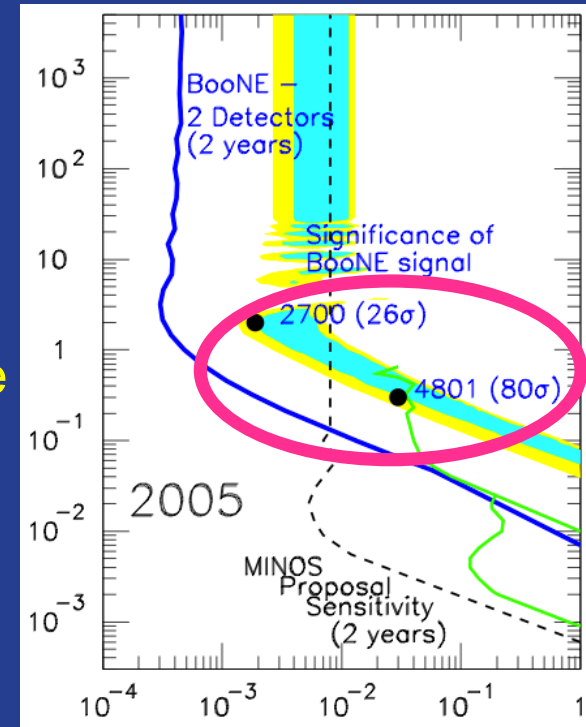
Process	200 – 300	300 – 475	475 – 1250
ν_μ CCQE	9.0	17.4	11.7
$\nu_\mu e \rightarrow \nu_\mu e$	6.1	4.3	6.4
NC π^0	103.5	77.8	71.2
NC $\Delta \rightarrow N\gamma$	19.5	47.5	19.4
External Events	11.5	12.3	11.5
Other Events	18.4	7.3	16.8
ν_e from μ Decay	13.6	44.5	153.5
ν_e from K^+ Decay	3.6	13.8	81.9
ν_e from K_L^0 Decay	1.6	3.4	13.5
Total Background	186.8 ± 26.0	228.3 ± 24.5	385.9 ± 35.7

<http://arXiv.org/abs/0812.2243>

- Systematics will be the ultimate limitation (single detector)
- Still interesting and necessary to understand how signal/background predictions has evolved, i.e. flux & xsec

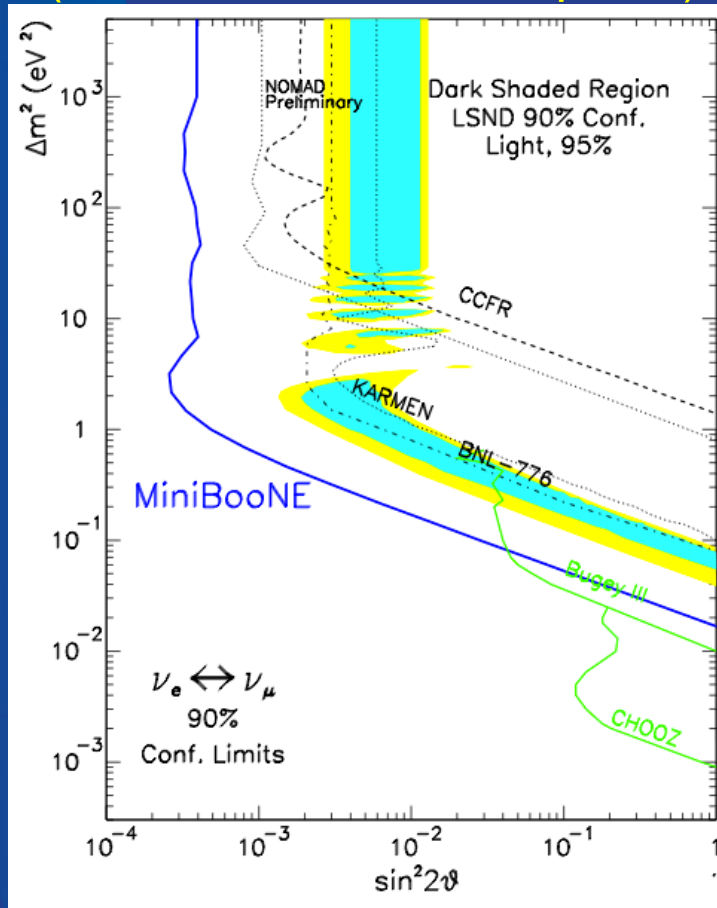
Confusion last week about signal prediction

- Part of this was my confusion of “2 detector”
- Used to thinking about 2 detector as adding a near detector not a 2nd far
- Not going to worry about this since we are just comparing to MiniBooNE’s single detector result



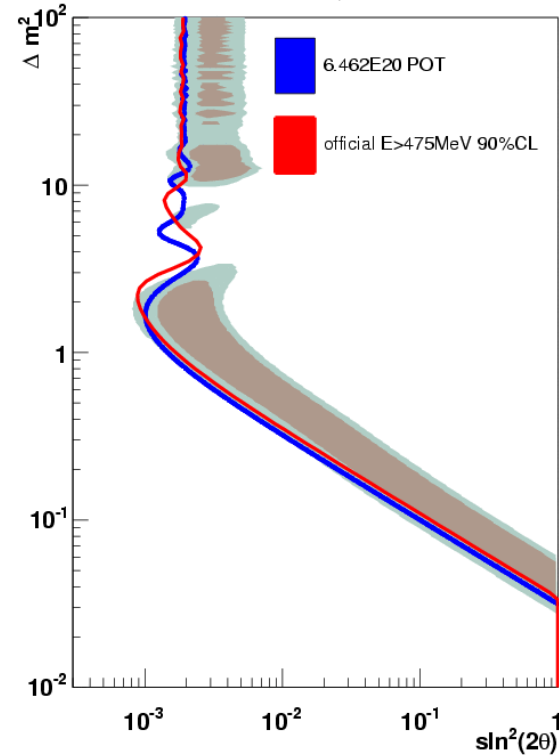
Still just tracing down this...

90% CL Sensitivity (1997 MiniBooNE Proposal)

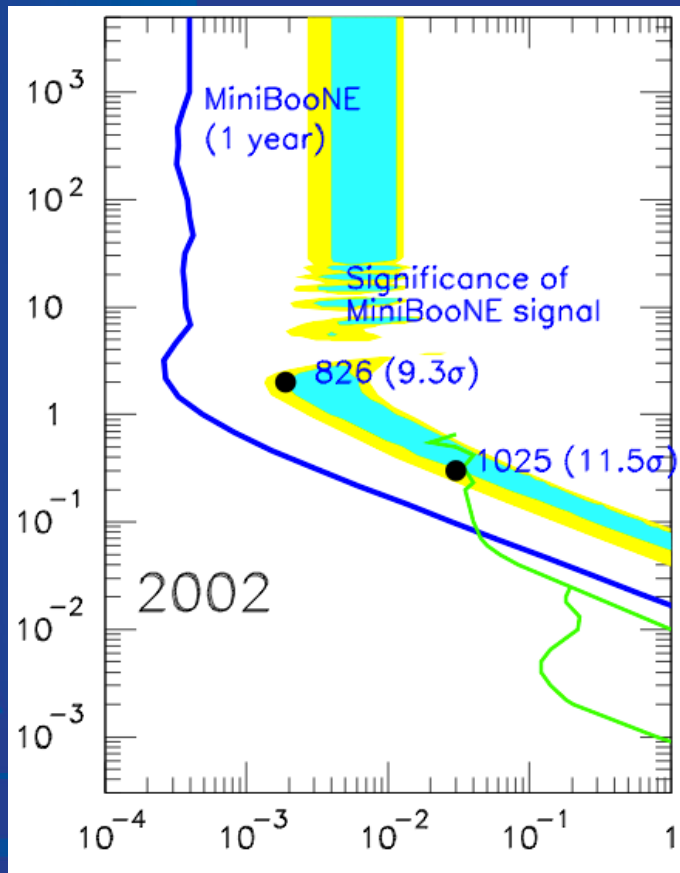


90% CL Sensitivity (Final 2008 ν Analysis)

Fermilab W&C Aug 2008 (C. Polly)...plot shows 90% CL sensitivity for the initial neutrino analysis (red) and with 0.83e20 POT added and some systematic updates (blue)

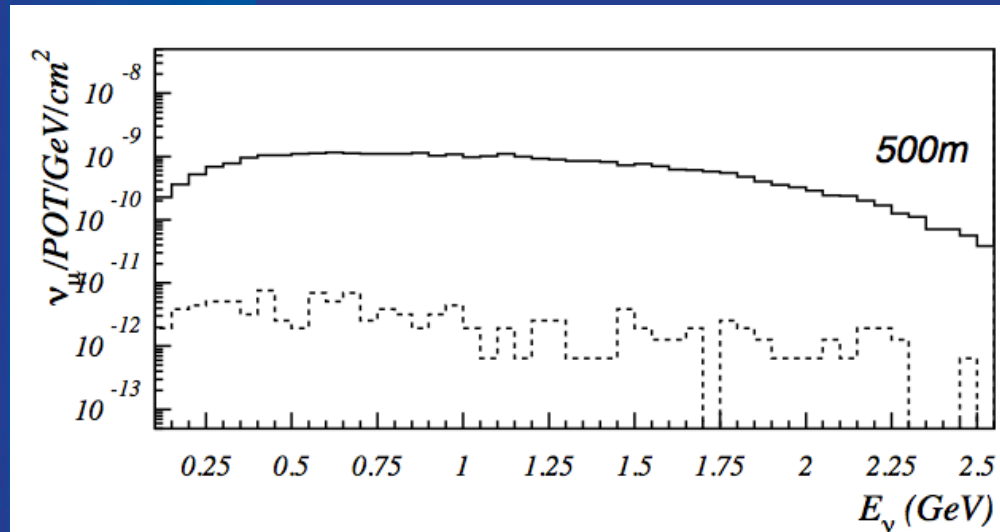


Single detector signal predictions



- Step 1: Reproduce these predictions
- Step 2: Substitute modern predictions for flux, xsec, efficiency

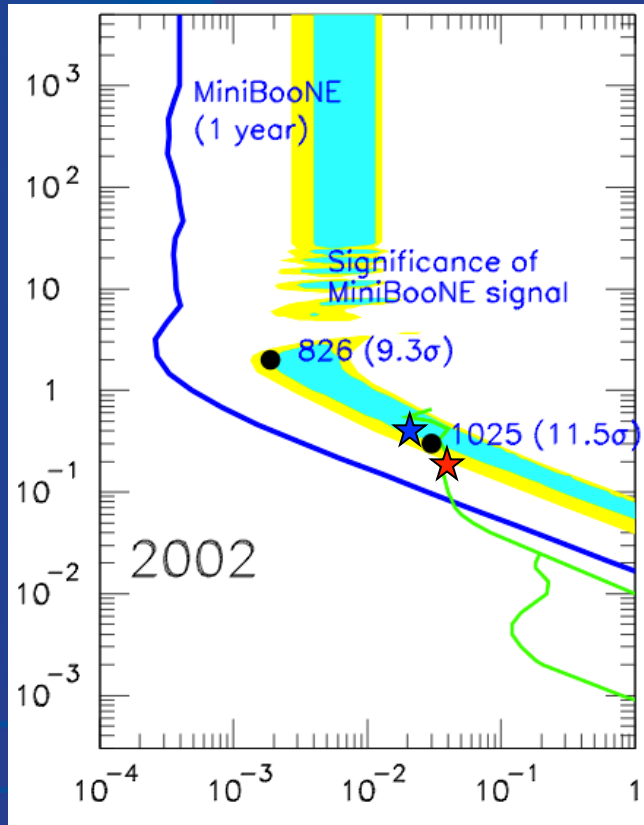
Single detector signal predictions



→ Step 0: Master Data Thief!



Compare expected signal rates, then and now



Points in phase space have not been our standards in a long time, but Zarko was able to quickly run the expected event rate

Expected signal (200MeV-3000MeV)

	Proposal	Current
POT	5e20	6.46e20
2 eV ² , 2x10 ⁻³ sin ² (2theta)	826	149
0.3 eV ² , 3x10 ⁻² sin ² (2theta)	1025	272

More proposal estimates...

Process	Number of Events
Oscillations with $\Delta m^2 = 0.2 \text{ eV}^2$ and $\sin^2 2\theta = 0.04$	675
Oscillations with $\Delta m^2 = 0.4 \text{ eV}^2$ and $\sin^2 2\theta = 0.02$	1200
μ^- Misidentification	600
π^0 Misidentification	600
Intrinsic ν_e Background	1800