

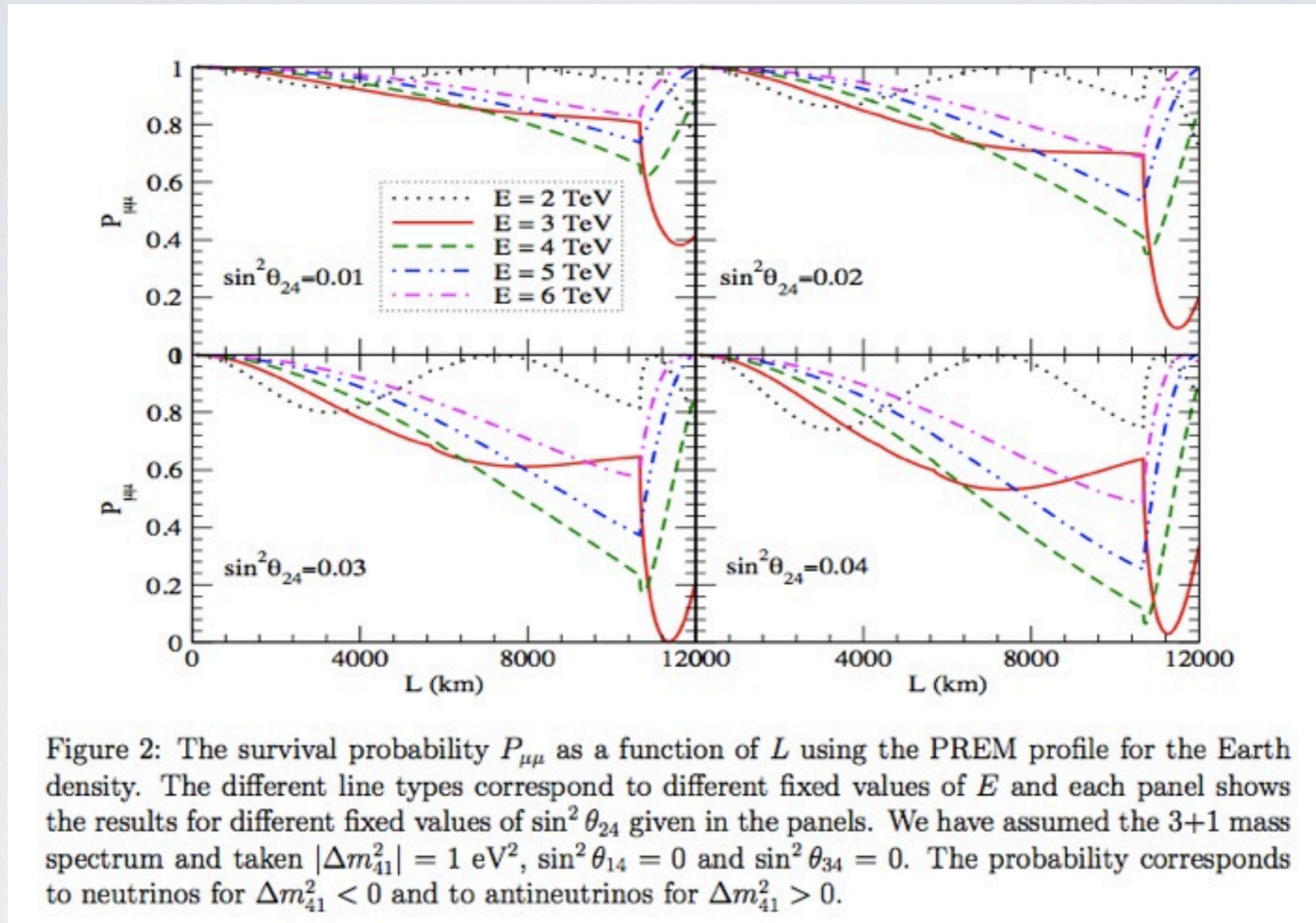


MSW EFFECT IN THE EARTH OF ATMOSPHERIC NEUTRINOS

Detectable in IceCube?

Elisa Resconi

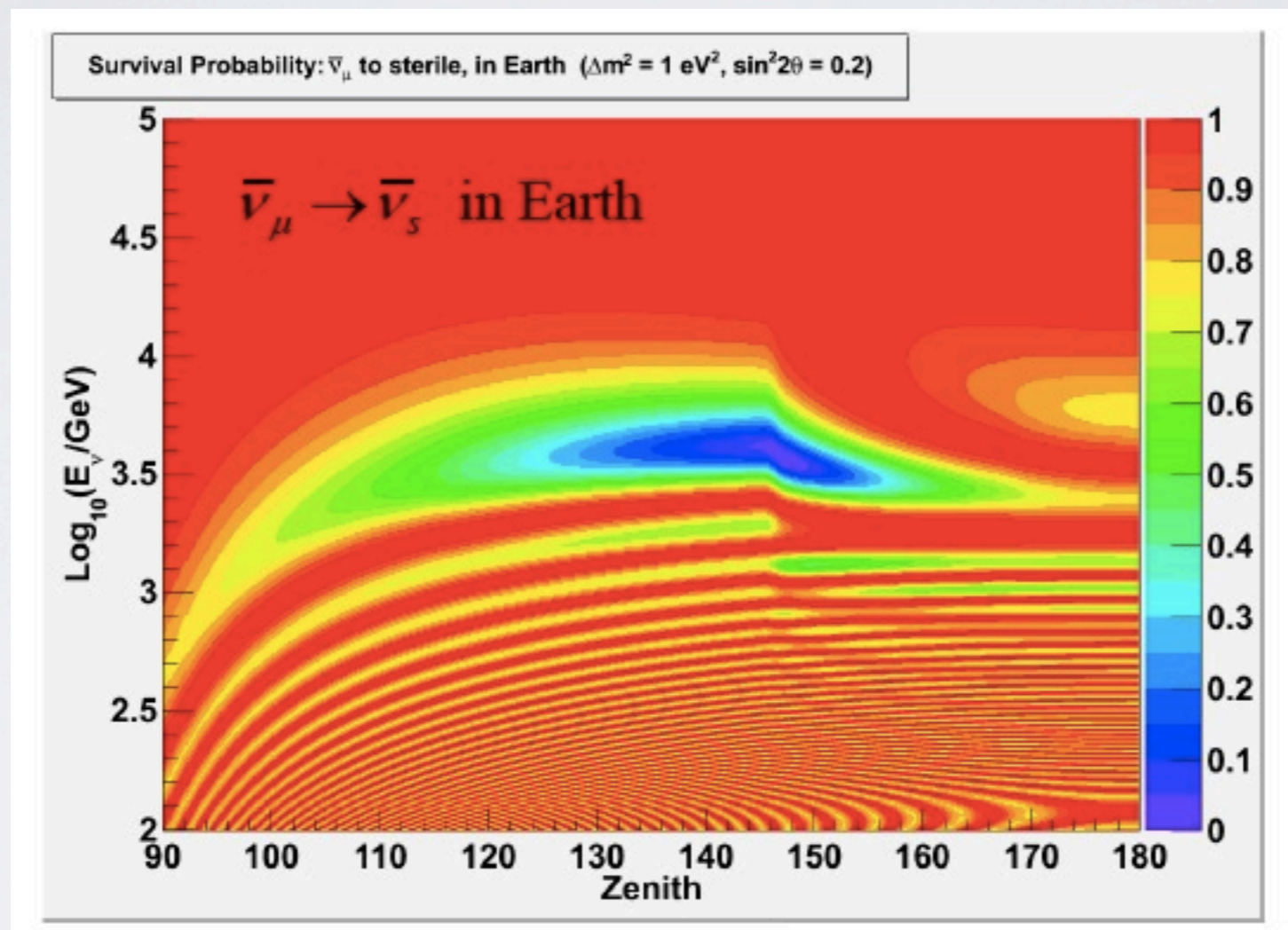
SANDHYA CHOUBEY ARXIV: 0709.1937



Resonant transition conditions satisfied with
MiniBooNE values

ZENITH - ENERGY

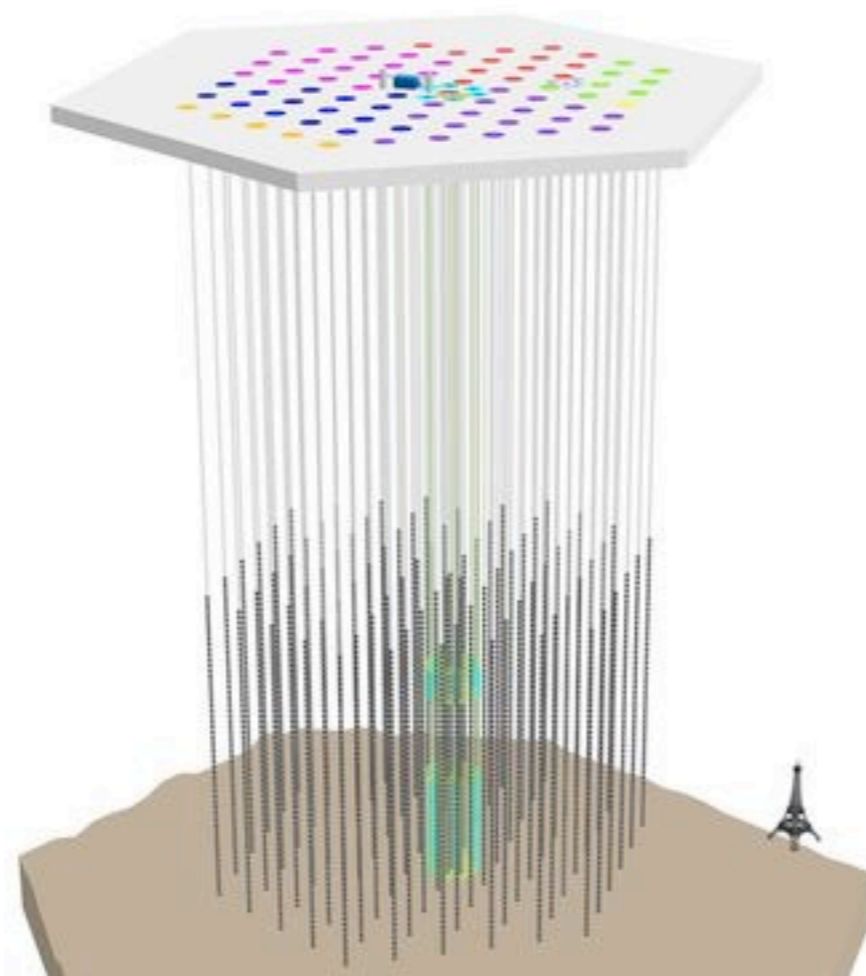
example



Warren Huelsnitz, private communication



ICECUBE COMPLETED!



40 strings: 2008-2009
59 strings: 2009-2010
79 strings: 2010-2011
86 strings: 2011-....

High statistics,
detection capabilities for UP- and DOWN-wards
events

ATMOSPHERIC NEUTRINO ENERGY SPECTRUM 100 GEV TO 400 TEV

By the IceCube Coll

e-Print: [arXiv:1010.3980](https://arxiv.org/abs/1010.3980)

IC-40 strings

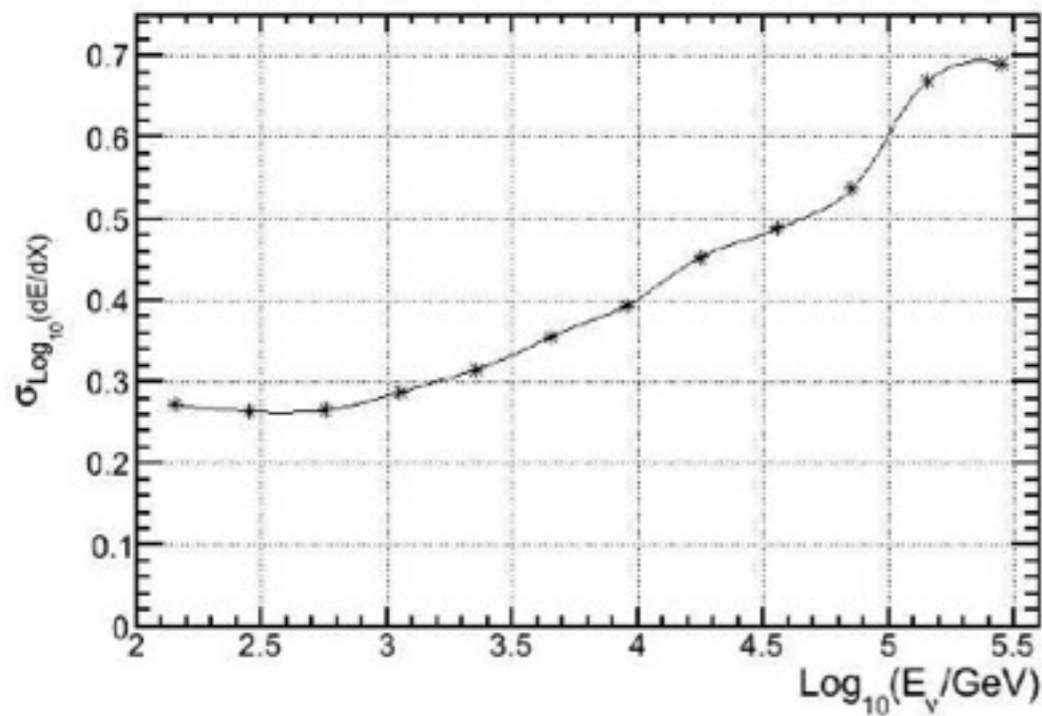


FIG. 15: Estimated neutrino energy resolution, from simulation.

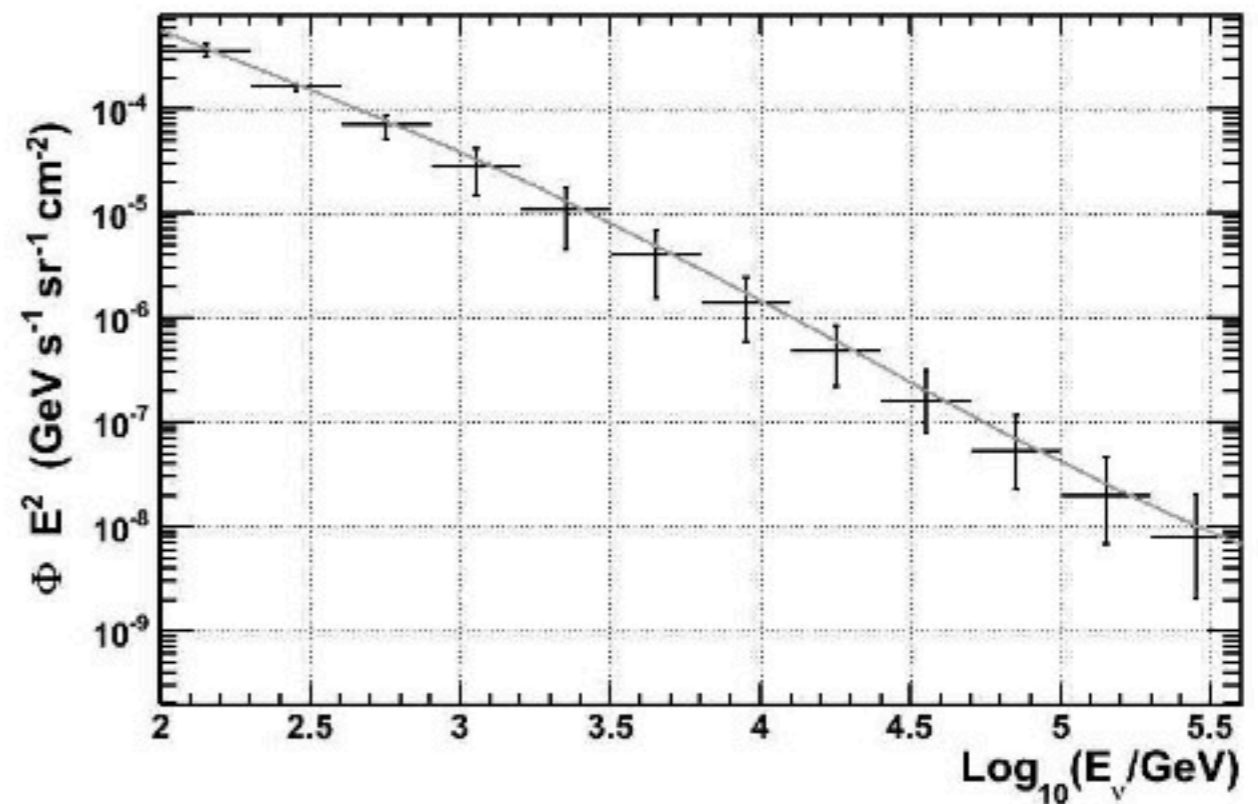


FIG. 17: Results of the atmospheric neutrino energy spectrum unfolding. The unfolded spectrum is shown in black, vertical lines are the estimated uncertainties. The gray line is the spectrum that provided the expected shape for the regularization, and includes the conventional atmospheric neutrino flux according to Honda *et al.* [3] and the prompt flux according to Enberg *et al.* [9]. This is the zenith-averaged $\nu_\mu + \bar{\nu}_\mu$ flux for the region $97^\circ - 180^\circ$.

ATMOSPHERIC NEUTRINO ZENITH DISTRIBUTION 100 GEV TO 400 TEV

By the IceCube Coll

e-Print: [arXiv:1010.3980](https://arxiv.org/abs/1010.3980)

IC-40 strings

Discrepancies observed

Under investigation:

- primary CR composition
- ice models /photon propagation
- DOM efficiency
- non simulated background

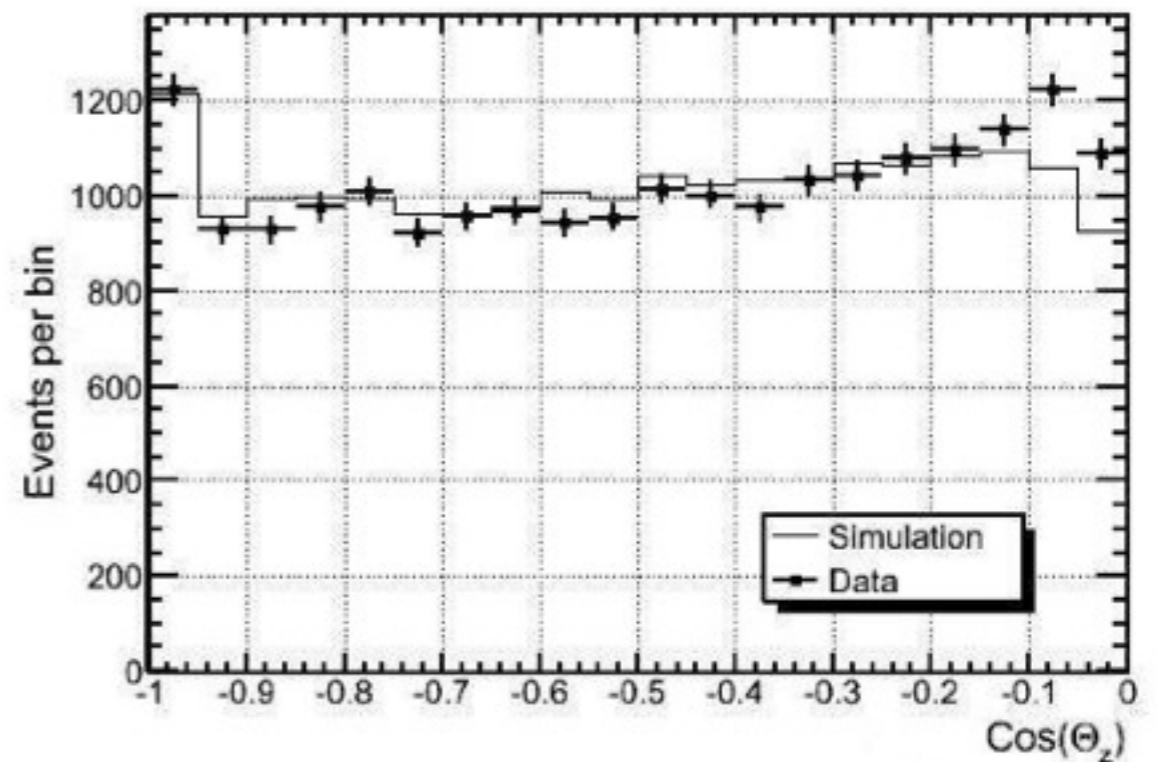
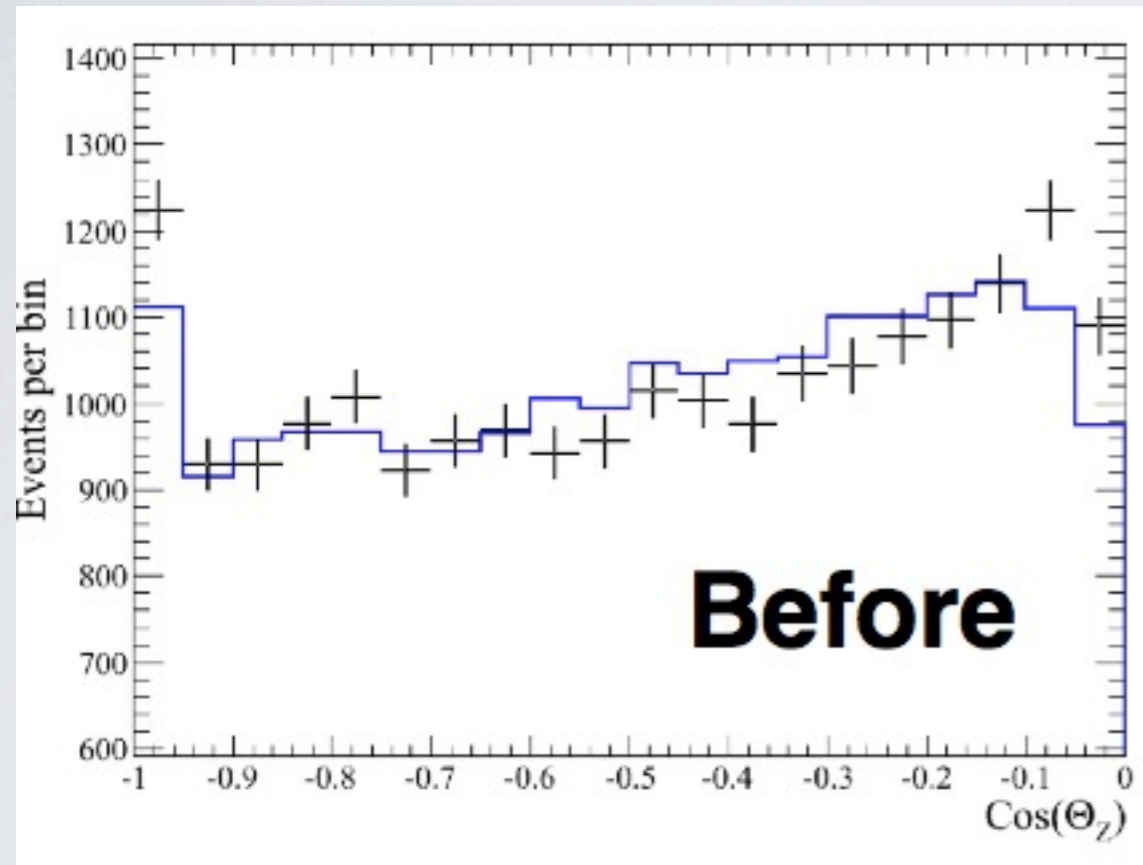


FIG. 19: Cosine(θ_z) distributions for data and for simulation, using zenith angle from the MPE fit. Simulation has been normalized to the data. Error bars for data are statistical only.

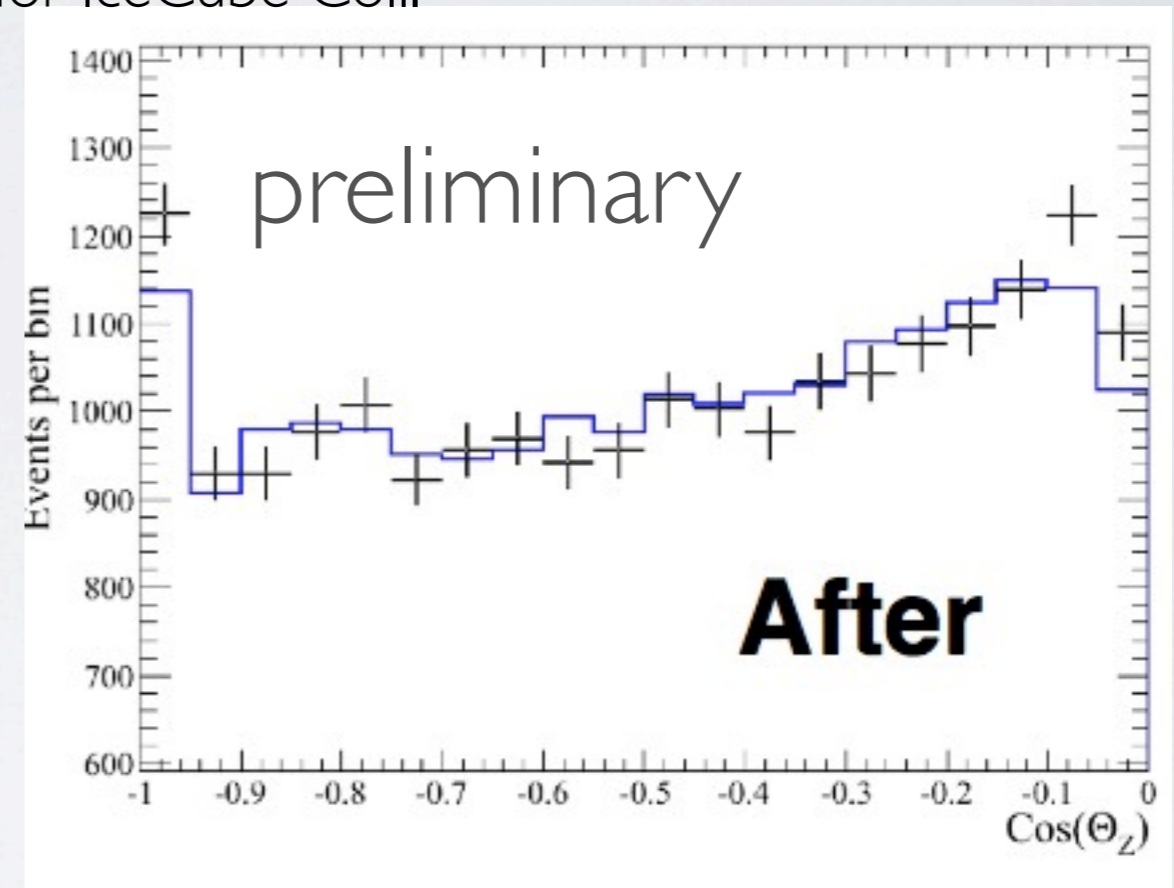
AS ALTERNATIVE

but for the moment nothing more than a speculation

Warren Huelsnitz, for IceCube Coll.

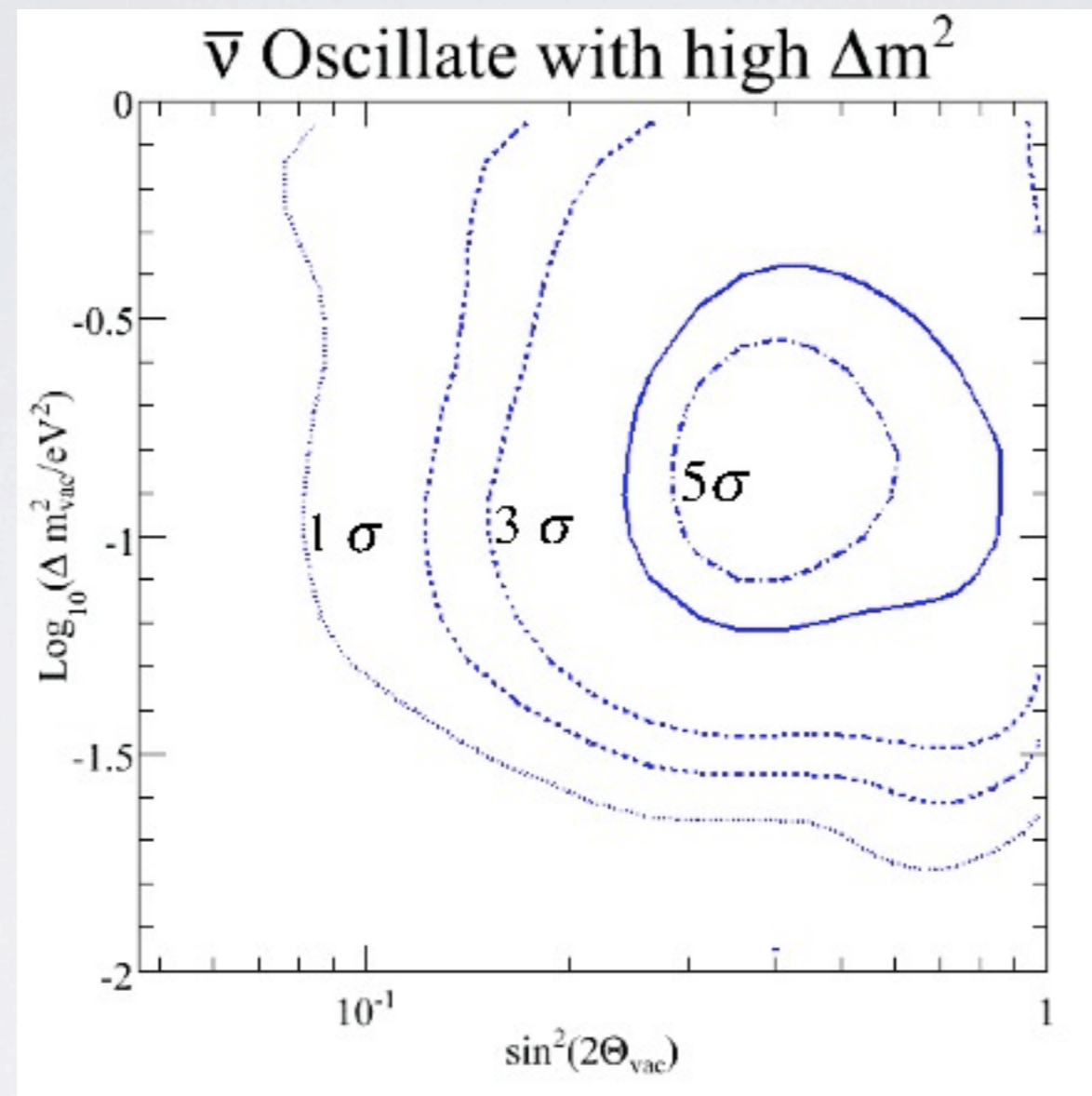


Atmospheric neutrinos MC + standard oscillation vs IC40 data



Atmospheric neutrinos MC + standard oscillation vs IC40 data + one sterile neutrinos and MSW effect in the Earth

IF WE ARE ABLE TO KEEP OUR SYSTEMATICS UNDER CONTROL



Warren Huelsnitz, private communication

IceCube might be able to be in the sterile neutrino business