

# TENSIONS SUBGROUP

# The Members

- ◎ *Present hints:* André de Gouvêa, Patrick Huber, Boris Kayser
- ◎ *Near-term measurements:* Richard Van de Water, Sam Zeller
- ◎ *Definitive experiments:* Steve Brice, Geoff Mills

## Present hints

- Distill contents of very complete light sterile neutrino white paper from VT. Summarize the hints from LSND, MiniBooNE, reactor experiments, Ga experiment calibration data, and cosmology. Quote and comment on results of global fits.
- Bottom line: Hints not convincing, but do point to POSSIBLE new physics that merits experimental exploration.
- Provide guidance on what needs to be measured if one is to be definitive.

List of expected measurements from on-going and near-term **approved** experiments

**appearance:**

MiniBooNE $\bar{\nu}_e$ appearance (expect x2 more data)  MiniBooNE combined $\nu_e, \bar{\nu}_e$ 3+N appearance fit  2012-2013	ICARUS $\nu_e$ appearance  T2K ND280 near detector  2013-2014	MicroBooNE $\nu_e$ appearance  2014-2017
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**disappearance:**

MiniBooNE/SciBooNE joint $\bar{\nu}_\mu$ disappearance	IceCube $\nu_\mu$ and $\bar{\nu}_\mu$ disappearance	MicroBooNE $\nu_\mu$ disappearance  MINOS+ high $\Delta m^2$ $\nu_\mu$ disappearance
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**other input:**

continued reactor flux calculations	radioactive source measurements (Borexino, Daya Bay, KamLAND, SNO+)  mass limit from Planck data	
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time 

# Requirements for Definitive SBL Experiments

*Should be convincing demonstration of oscillations:*

- “Guaranteed” or well understood significance  $\geq \sim 5\sigma$
- Clear L/E dependence where L is varied as well as E
- Backgrounds are either known, or measured by an identical detector at one or several different locations
- Since sterile neutrino oscillation models may have many parameters to constrain, including CP phases, several measurements would be desirable
  - $\nu_e$  and  $\bar{\nu}_e$  appearance
  - $\nu_\mu$  and  $\nu_e$  disappearance
  - Neutral current channel disappearance