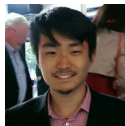


Background



Me



My supervisor

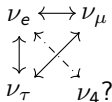
DAAD Deutscher Akademischer Austauschdienst
German Academic Exchange Service

My funding agency



www.nu-fit.org

My topic



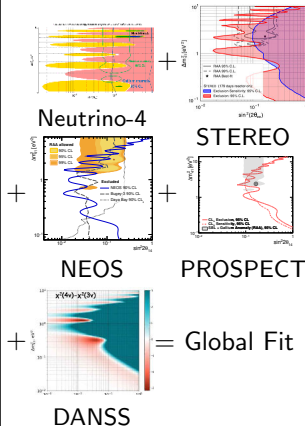
Neutrino oscillations

$\nu_4?$ Fourth light sterile neutrino?

Flux-free searches for oscillations at short-baseline tell conflicting story.

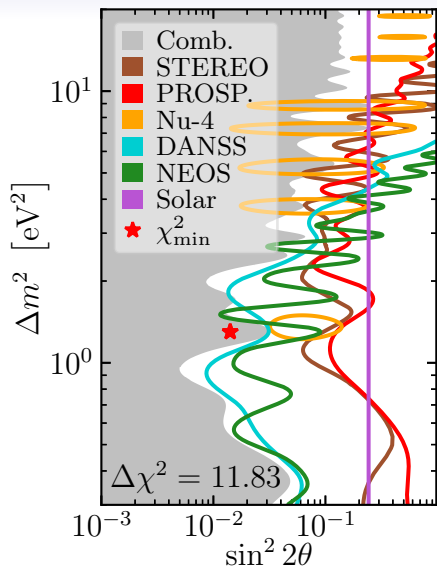
Neutrino-4 sees 2.9σ signal of new oscillations [PRD **104**, 032003 (2021)] at large mixing and mass-squared splitting ($\Delta m^2 = 7.3 \text{ eV}^2$, $\sin^2 2\theta = 0.36$)

BEST confirmed gallium anomaly at $> 5\sigma!$

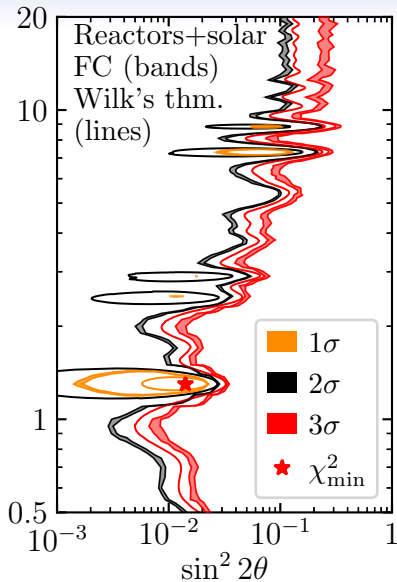


Solar data are also considered, which introduces a limit on $\sin^2 2\theta$, independent of Δm^2

Global Feldman-Cousins analysis

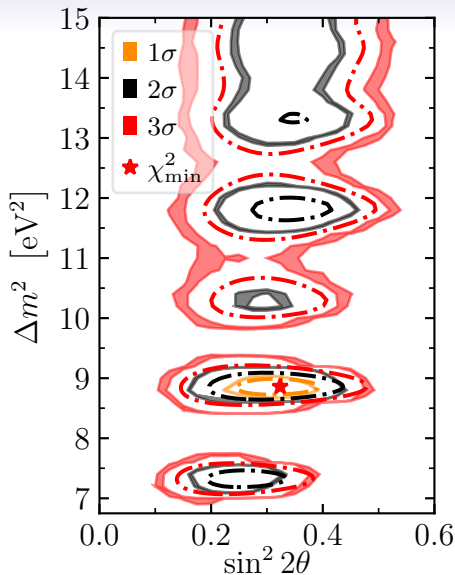


$\Delta\chi^2$ contours (3 σ significance under Wilks' theorem for 2 dof)



Reactor+solar Feldman-Cousins analysis with 10⁴ MC trials per parameter point

The reactor anomaly is dead! Long live the gallium anomaly!



Reactor+gall. Feldman-Cousins analysis
with 10^4 MC trials per parameter point

- BEST recently confirmed a deficit of the absolute flux of a well-calibrated ^{51}Cr source
- BEST has $> 5\sigma$ anomaly; in $\sim 3\sigma$ tension with solar data
- Gallium pulls best-fit point from $\Delta m^2 = 1.30$ eV² and $\sin^2 2\theta = 0.014 \rightarrow \Delta m^2 = 8.86$ eV² and $\sin^2 2\theta = 0.26$.
- Conversion from calorimetric to neutrino activity may have hidden systematics (to do)