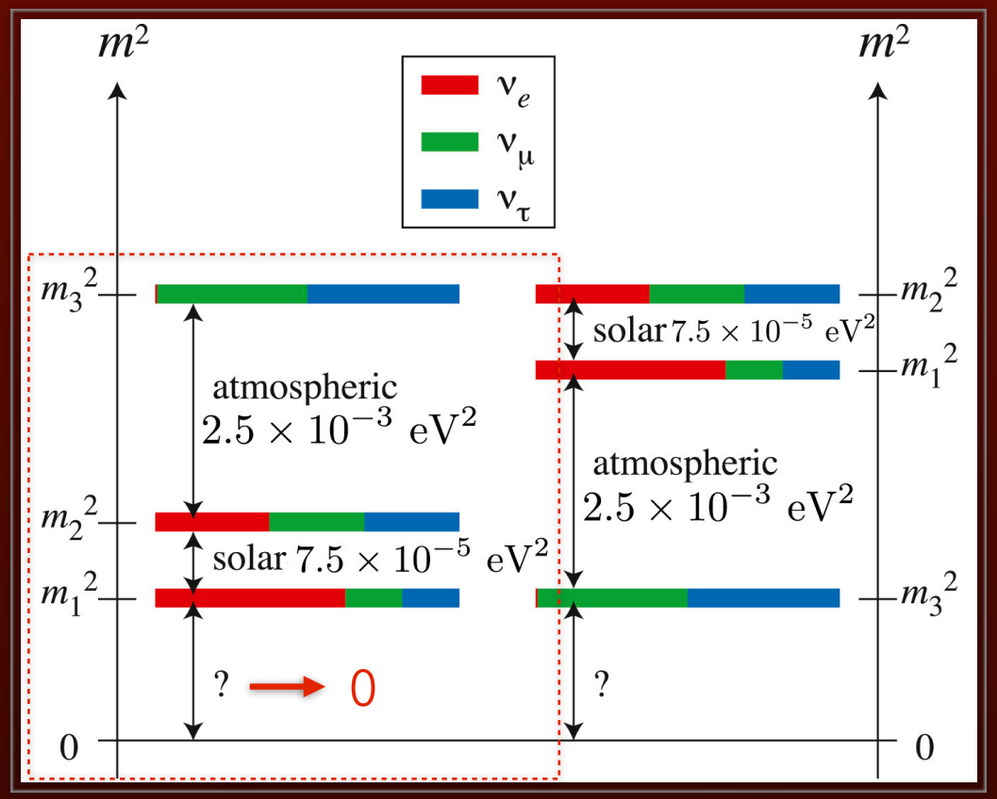
Susana Molina Sedgwick

UNIVERSITY OF Southampton

Determining the masses of Right-Handed Neutrinos in the Littlest Seesaw

- Littlest Seesaw:
  SM extension with 2 new RHν singlets
- Renormalisation Group Evolution:
  Evolve observables to low scales using RG running (REAP)
- Leptogenesis:
  Lepton asymmetry generated through decay of lightest RHν



$$Y_{\Delta\alpha} = \eta_\alpha \epsilon_\alpha Y_{N1}^{eq} \quad \Longrightarrow \quad Y_B = \frac{12}{37} \sum_{\alpha=e,\mu,\tau} Y_{\Delta\alpha}$$

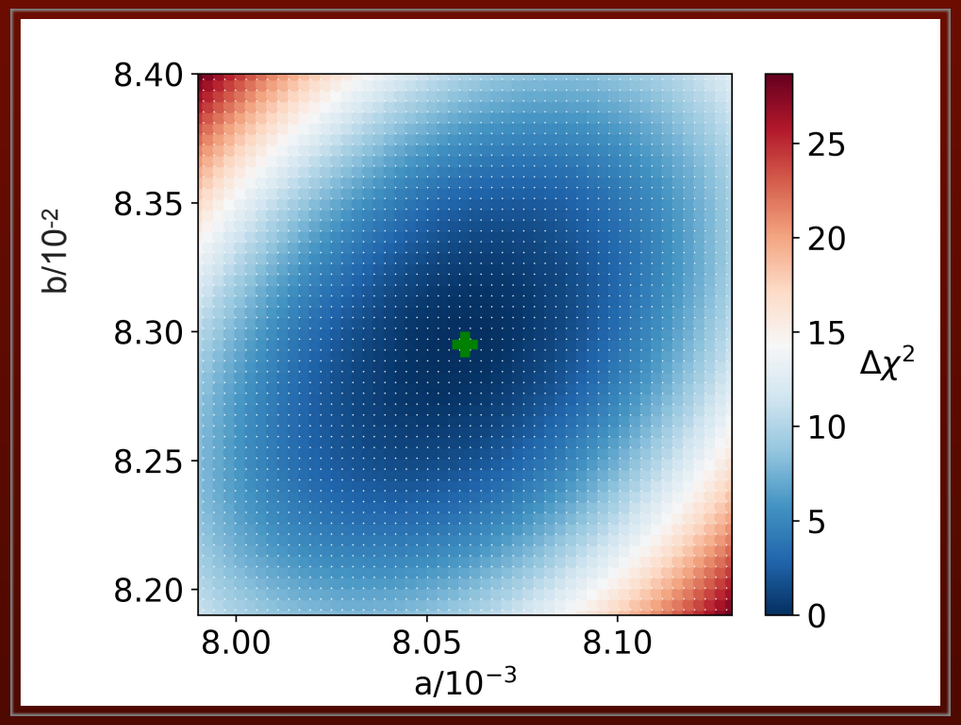
Method: Fit high scale parameters to low scale neutrino data and BAU from Leptogenesis (χ^2 analysis)

Scan over neutrino masses:

$$1.0 \times 10^9 \leq M_1 \leq 5.0 \times 10^{12} \quad \text{[GeV]}$$
$$5M_1 \leq M_2 \leq 1.0 \times 10^{16} \quad \text{[GeV]}$$

and *a*, *b* : free parameters in Yukawa matrices

⇨ 4-dimensional gridding



	Case A	Case D
M_{atm} / GeV	5.051 x 10^{10}	1.357 x 10^{13}
M_{sol} / GeV	5.067 x 10^{13}	1.056 x 10^{10}
a	0.00805868	0.13484
b	**0.082948**	**0.00115694**
χ^2 / d.o.f.	3.17 / 3	4.65 / 3

> LS highly predictive: 7 observables from 4 parameters

> Excellent fit; suggests $\delta \simeq -90°$; allows indirect prediction of RHν masses

Learn about high energies ⟷ Testable at low energies