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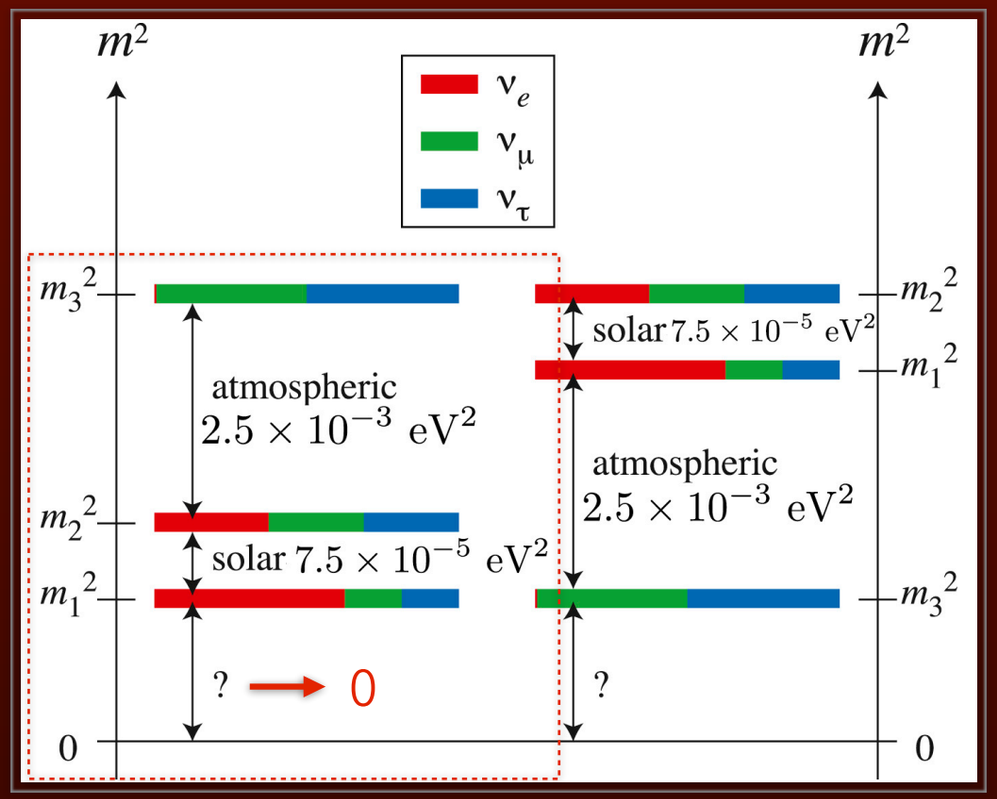
INVISIBLES WORKSHOP 2018

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



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

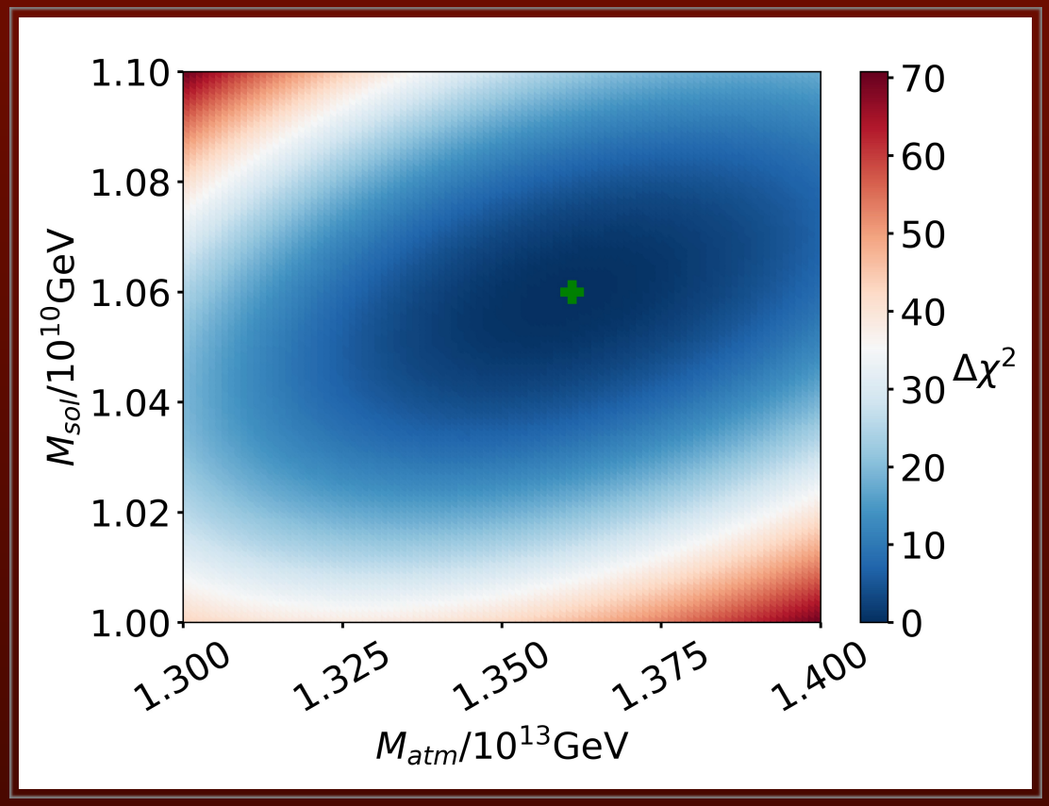
Method: Fit high scale parameters to low scale neutrino data and BAU from Leptogenesis (χ^2 analysis)

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

	Case A	Case D
M_{atm} / GeV	5.05 x 10^{10}	1.36 x 10^{13}
M_{sol} / GeV	5.07 x 10^{13}	1.06 x 10^{10}
a	0.00806	0.135
b	0.0830	0.00116
χ^2 / d.o.f.	1.75 / 3	2.07 / 3



⇨ 4-dimensional gridding

Additional studies
- Dependence on Λ_{GUT}
- Future tests of the Littlest Seesaw

- LS highly predictive: 7 observables from 4 parameters
- Allows indirect prediction of RHv masses
- Suggests $\delta \simeq -90°$; excellent fit to all other neutrino and BAU data
- Enables testing in future experiments

Learn about high energies ⟷ Testable at low energies

Thank you!

In collaboration with
STEVE KING and SAM ROWLEY

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