

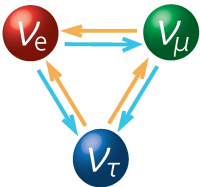
Mapping the viable parameter space for testable leptogenesis

Yannis Georis

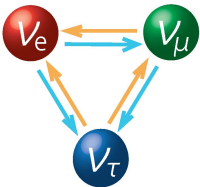
based on work in collaboration with M. Drewes and J. Klarić
[arXiv:2106.16226]

Second EuCAPT Annual Symposium
May 25, 2022



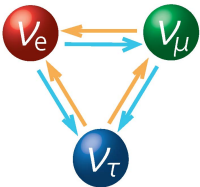


] C-zq β 'b \ -ssCs



] C-zq⁸b \ -ssCs

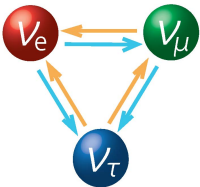
[Planck]
3 - q^h ^ - s^oo \ Czq^o



$\int C \sim \alpha^2 \beta \backslash - ssCs$

| Spin-1/2 fermions | | | | | | Spin-1 bosons | | | | |
|-------------------|------|---------|-------|------|---------|---------------|------|---------|----------------|--------------------|
| Quarks | Left | u | Right | Left | c | Right | Left | t | g | Spin-0 Higgs boson |
| | Left | d | Right | Left | s | Right | Left | b | | |
| Leptons | Left | ν_1 | Right | Left | ν_2 | Right | Left | ν_3 | Z^0 | H |
| | Left | e | Right | Left | μ | Right | Left | τ | Force carriers | |

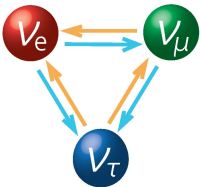
[Planck]
 $3 - \alpha \wedge - S \alpha \backslash C \alpha$



$\theta_{12} \approx 33^\circ, \theta_{13} \approx 1^\circ, \theta_{23} \approx 45^\circ$

[Planck]

$\sum m_\nu < 0.12 \text{ eV}$



$\theta_{12}, \theta_{13}, \theta_{23}, \delta$

[Planck]

$\theta_{12}, \theta_{13}, \theta_{23}, \delta$

$\theta_{12}, \theta_{13}, \theta_{23}, \delta$

$r - \text{VP} - \text{df} < \text{b}^{\wedge} @ \text{SS}^{\wedge} \text{s} =$

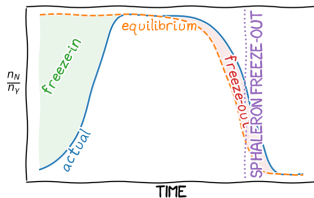
- | C- and CP-violation
- ? RHN decay and oscillations

- | Deviation from thermal equilibrium
- ? Freeze-out and freeze-in of the RHN

- | Baryon number violation

$r - \nu - \rho_f \langle \bar{\nu} \nu \rangle =$

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$r - \text{VP} - \text{df} \langle \text{b}^{\wedge} @ \text{SS}^{\wedge} \text{s} =$

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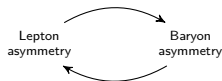
- | Baryon number violation

r-VP-df $\hat{b} @ \hat{S} \hat{b}^s =$

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- ? Sphaleron process

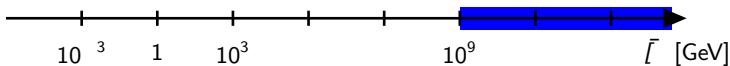
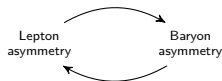


$r = \frac{V_p}{V_f} \ll 1$

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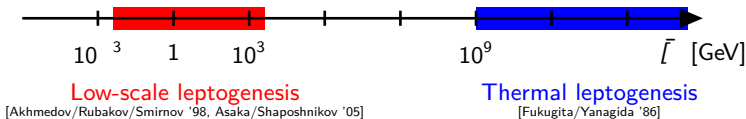
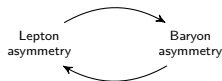
Thermal leptogenesis
[Fukugita/Yanagida '86]

$$r - \text{VP} - \text{CP} \ll \text{b}^{\text{S}} \text{b}^{\text{S}} =$$

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| BteCp, C^zs ..SY <~z @00e S^zb ^ = { e-q \ CzCq se- <D

- | BteCp, C^zs ..SY <-z @Ce S^zb ^ = { e-q \ CzCq se- <D
- | ; - ^ CteCz zb ep@- <CzPb~s- ^@s bH@SeY <@fCqS-Cs -z OXOXO; =
yCz- 4SS%f

- | BteCp, C^zs ..SY <-z @Ce S'zb ^ = { e-q \ CzCq se-<D
- | ; - ^ CteCz zb ep@-C zPb~s ^@s bH@SeY <@fCqS-Cs -z OXOXO; =
yCsz-4SS%F
- | XGezblC^CsS ..zP zPCq -YS^SS Y<b^@Sb^s ..bqW Hbq \ -ssCs -s Yb...
-s O(c.u) KÇ =zCsz-4C -z dLi] , v|i