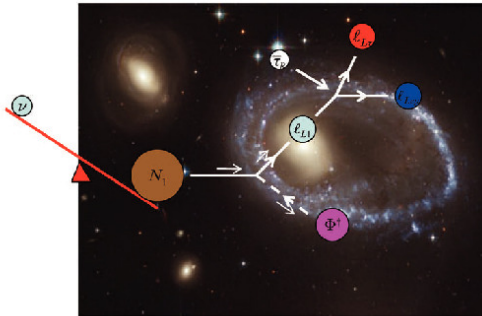




Steve Blanchet (Autor)
A new era of Leptogenesis

Steve Blanchet

A New Era of Leptogenesis



 Cuvillier Verlag Göttingen

<https://cuvillier.de/de/shop/publications/1450>

Copyright:
Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen,
Germany
Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Contents

Summary	i
Acknowledgments	v
1 Introduction	1
1.1 The matter-antimatter puzzle	1
1.2 The puzzle of neutrino masses	7
1.2.1 Theory of neutrino oscillations	7
1.2.2 Experimental evidence for neutrino oscillations	8
1.2.3 Absolute neutrino mass scale	11
1.3 The see-saw mechanism and leptogenesis	12
2 Vanilla leptogenesis	17
2.1 General scenarios of unflavored leptogenesis	17
2.2 The N_1 -dominated scenario	24
2.3 Leptogenesis and supersymmetry	35
3 Adding flavor to vanilla leptogenesis	39
3.1 When does flavor matter and why?	39
3.2 Flavored Boltzmann equations and spectator processes	41
3.3 In practice, what changes?	44
3.4 Dependence on the initial conditions and lower bounds	48
3.4.1 Alignment	49
3.4.2 Democratic and semi-democratic cases	51
3.4.3 One-flavor dominance	52
3.5 Study of a specific example	54
4 From classical to quantum kinetic equations	61
4.1 Validity of the different pictures	62
4.1.1 When are flavor effects important?	62
4.1.2 Maximum flavor effects	65

4.2	Neutrino mass bound	67
4.3	Limitations of a simple rate comparison	70
4.4	Density matrix equation	71
5	Going beyond vanilla leptogenesis	79
5.1	Degenerate limit for the heavy neutrinos	80
5.2	N_2 -dominated scenario	83
5.3	Effects of $ \Omega_{22} $	85
6	Leptogenesis from low-energy CP-violating phases	87
6.1	CP violation in neutrino physics	88
6.1.1	Neutrino oscillations and the Dirac phase	88
6.1.2	Neutrinoless double-beta decay and the Majorana phases	89
6.2	Dirac phase leptogenesis	90
6.2.1	The hierarchical limit	90
6.2.2	The degenerate limit	101
6.3	Leptogenesis from the Majorana phases	110
6.4	Discussion	111
7	Conclusion	115
A	Neutrino mixing parameters	121
B	The see-saw mechanism with three RH neutrinos	123