1. Record Nr. UNINA9910254601903321

| | |
|---|---|
| Autore | Biondini Simone |
| Titolo | Effective Field Theories for Heavy Majorana Neutrinos in a Thermal Bath / / by Simone Biondini |
| Pubbl/distr/stampa | Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017 |
| ISBN | 3-319-63901-3 |
| Edizione | [1st ed. 2017.] |
| Descrizione fisica | 1 online resource (221 pages) |
| Collana | Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053 |
| Disciplina | 410.72 |
| Soggetti | Particles (Nuclear physics)<br>Quantum field theory<br>Cosmology<br>String models<br>Elementary Particles, Quantum Field Theory<br>Quantum Field Theories, String Theory |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | "Doctoral Thesis accepted by the Technical University of Munich, Germany." |
| Nota di bibliografia | Includes bibliographical references at the end of each chapters and index. |
| Nota di contenuto | Baryon Asymmetry in the Early Universe -- Baryogenesis via Leptogenesis -- Eective Field Theories -- Thermal Field Theory in a Nutshell -- EFT Approach for Right-handed Neutrinos in a Thermal Bath -- CP Asymmetries at Finite Temperature: the Nearly Degenerate Case -- CP Asymmetries at Finite Temperature: the Hierarchical Case -- Flavoured CP Asymmetries. |
| Sommario/riassunto | This thesis discusses the construction of an effective field theory (EFT) for non-relativistic Majorana fermions, shows how to use it to calculate observables in a thermal medium, and derives the effects of these thermal particles on the CP asymmetry. The methods described in this thesis are the only ones to date that allow a systematic and effective description of the non-relativistic dynamics of a heavy Majorana fermion at finite temperature. The CP asymmetry is studied for hierarchical and nearly degenerate heavy-neutrino masses and the analysis includes the treatment of lepton-flavor effects. Heavy |

Majorana neutrinos are involved in many scenarios of physics beyond the standard model and, in the leptogenesis framework, they are at the root of the baryon asymmetry in the Universe. Besides simplifying existing results, the EFT approach provides useful tools for addressing even more involved observables. Indeed, taken together, the approach and the material pres ented here represent an important step toward a systematic improvement of our knowledge of the CP asymmetry in heavy-neutrino decays at finite temperature.