Contribution ID: **13** Type: **Talk**

Non-relativistic Majorana neutrinos in a thermal bath and leptogenesis

Thursday 28 August 2014 17:30 (20 minutes)

Cosmology and particle physics come across a tight connection in the attempt to reproduce quantitatively the results of experimental findings. Indeed, the dark matter relic abundance and the amount of baryon asymmetry in the universe are accurately determined by the recent analysis of the cosmic microwave background. The Standard Model can not account for none of these evidences.
Majorana fermions enter in many scenarios of physics beyond the Standard Model. In the simplest leptogenesis framework, Majorana neutrinos are at the origin of the baryon asymmetry. The non-relativistic regime comes up to be relevant during the lepton asymmetry generation. Moreover, all the interactions occur in a thermal medium, namely the universe in its early stage.
We discuss the development of an effective field theory for non-relativistic Majorana particles to simplify calculations in a thermal medium. Then, we apply it to the case of a heavy Majorana neutrino decaying in a hot and dense plasma of Standard Model particles, whose temperature is much smaller than the mass of the Majorana neutrino but still much larger than the electroweak scale. Thermal corrections to the neutrino width and CP violating parameter are addressed.
These techniques are analogous to those widely used for the investigation of heavy-ions collisions at LHC by exploiting hard probes. For instance, heavy quarkonia suppression and jet quenching are effects induced by an hot QCD medium. We show the similarities with the former case of Majorana neutrinos in medium. The development and application of resummation techniques in hot QCD or cosmology can benefit both fields.

Primary authors: Dr VAIRO, Antonio (Technische Universitaet Muenchen); Dr ESCOBEDO, Miguel (Technische Universitaet Muenchen); Prof. BRAMBILLA, Nora (Technische Universitaet Muenchen); Mr BIONDINI, Simone (Technische Universitaet Muenchen)

Presenter: Mr BIONDINI, Simone (Technische Universitaet Muenchen)

Session Classification: Neutrinos and related astrophysical implications

Track Classification: 3) Neutrinos and related astrophysical implications