

# XXX-th International Workshop on High Energy Physics “Particle and Astroparticle Physics, Gravitation and Cosmology: Predictions, Observations and New Projects”



Contribution ID: 57

Type: **Presentation**

## Average thermal evolution of the universe

*Friday 27 June 2014 14:05 (25 minutes)*

The scale parameter and the average behavior of the temperatures and densities of the main components of the  $\Lambda$ CDM universe are sketched, beginning after the end of inflation. The universe is treated as a perfect fluid. A model of dark energy based on conformal variations of the metric is briefly discussed. Darkmatter is assumed to consist of neutralinos, a LSP and leading WIMP candidate. The main events of the thermal evolution are studied, such as the effect of particle decoupling and the transitions between eras dominated by the different entities. We examine the distinction between Majorana and Dirac neutrinos based on the influence they have on the age of the universe and on the present epoch neutrino density.

**Presenter:** BLIN, Alex H. (University of Coimbra)

**Session Classification:** Theoretical and observational cosmology