

keV sterile neutrinos and new tests for non-thermal dark matter candidates

Tuesday, 20 June 2017 14:30 (30 minutes)

Among their many connections to open issues of particle or astro physics, sterile neutrinos in the keV mass range are very well motivated dark matter candidates. Unlike the famous WIMP, dark matter in the keV mass range would by far overclose the universe if it was produced in a standard thermal freeze-out scenario. A variety of non-thermal production mechanisms for keV sterile neutrinos can be found in the literature, like resonant or non-resonant active-sterile conversion as well as production via the decay of some heavier particle(s). All these models result in non-thermal momentum distribution functions for the sterile neutrinos, which makes a detailed analysis of structure formation one of the cornerstones to test the models. Since most of the literature on structure formation focussed on thermally distributed particles (including the limiting case of CDM) in the past, new and innovative analysis methods are needed for non-thermal dark matter candidates on the keV scale.

In my talk, I will give an overview over different production mechanisms for keV sterile neutrino dark matter and the different constraints they have to face. In particular, I will introduce new methods of assessing the compatibility with cosmic structure formation that can be applied to any other non-thermally distributed dark matter candidate.

Primary author: TOTZAUER, Maximilian (Max-Planck-Institut für Physik)

Presenter: TOTZAUER, Maximilian (Max-Planck-Institut für Physik)

Session Classification: Working Group: Astroparticle physics and cosmology

Track Classification: Astroparticle Physics and Cosmology Working Group