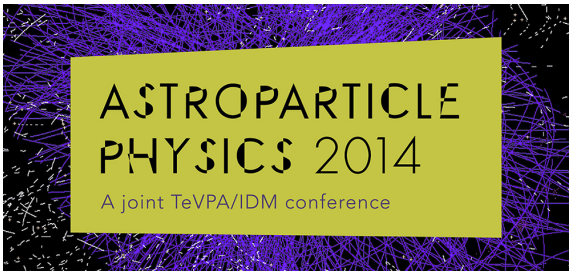

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Warm Dark Matter from the Large Scale Structure

Friday, June 27, 2014 4:50 PM (20 minutes)

Warm Dark Matter (WDM) is a generalisation of the standard Cold Dark Matter model in the sense that it does not assume dark matter particles to be absolutely cold. In the simplest models all dark matter is made of the same particles, which started out in thermal equilibrium and cooled to effectively become cold today. If such particles have masses of the order of a keV or less, they leave an observable imprint on the dark matter density field. At late times, the perturbations in the matter density field become non-linear. This means that they cannot be described perturbatively any longer. For this reason, N-body simulations are a good way to understand the formation of non-linear structure. Simulating WDM can be a challenge, because unlike CDM, it's relatively large thermal velocities can introduce unwanted Poisson noise on small scales. With better computing resources nowadays it has become possible to examine WDM cosmologies with simulations. This talk will present results of such simulations together with the halo model and discuss how to calculate non-linear corrections to the matter power spectrum, which describes the matter density field today. It will also discuss the possibility of constraining the dark matter particle mass using measurements of large scale structure, like cosmic shear or galaxy clustering.

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