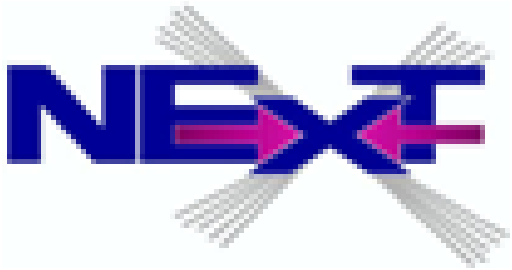

Contribution ID: **38** Type: **not specified**

Probing Asymmetric Dark Matter with the CMB

Thursday 1 July 2021 15:20 (5 minutes)

The CMB anisotropies are an incredibly accurate probe of the ionisation history of our universe. Sources of energy injection into the intergalactic medium (IGM) act to dampen the CMB signal and can give insight into the processes that lead to the reionization of our universe. Typically, the epoch of reionization is attributed to energy injection from early star formation. Other sources of energy injection such as dark matter (DM) annihilation, is the main interest in this project. Current Planck constraints on DM annihilation are summarised in the annihilation parameter, which is a function of a DM particle mass, cross-section, and efficiency of the energy deposition rate. In this project, the CMB constraints on WIMPs-like particles have been investigated for the scenario where there is a dark matter asymmetry in this model called, asymmetric dark matter (ADM). This has been heavily motivated by the fact there is an asymmetry for baryonic matter. Useful updates on the CMB constraints for the annihilation parameter have meant there is a new parameter space in determining the nature of an ADM scenario. Furthermore, a new code has been developed, AsymDM, which can now produce efficient and accurate calculations of the annihilation cross-section, for a given mass, asymmetry, CMB anisotropy constraints, and the dark matter abundance. The results from this code can be applied to other models that include DM annihilation given the simple scaling relation that had been found in this work. This result was applied to constraining ADM using an exciting and upcoming field within cosmology, spectral distortions.

Primary author: POONI, Charis (King's College London)

Presenter: POONI, Charis (King's College London)

Session Classification: Student talks