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Distinguishing between Warm Dark Matter and Late Kinetic Decoupling using CMB spectral distortions.

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Recently a number of alternative dark matter models have been introduced as a means of explaining the physics of small-scale structure formation. These include, warm dark matter and dark matter with late kinetic decoupling both of which differ substantially from the canonical cold dark matter formalism. One interesting way of constraining the phenomenology in these models is to look at the characteristic imprint they leave on the photon spectrum left over from the Big Bang. These imprints are known as spectral distortions in the literature and arise due to spatial fluctuations in the photon temperature along the line of sight. As a result, the thermal history of the photon bath gives us a unique insight into the evolution of the early universe. In this talk I will show how this insight can be used to constrain the phenomenology of these dark matter models, in particular noting that the signatures can be used to distinguish between warm dark matter and late kinetic decoupling scenarios.

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