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Warm Dark Matter Constraints using the Lyman-alpha Forest

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Lyman-alpha absorption features probe the distribution of neutral Hydrogen (a legitimate tracer for dark matter) along the line-of-sight of luminous, high-redshift quasars. As such, they are a useful tool for probing the power spectrum at scales below a few Mpc and can thus be a powerful data set to test non-linear cosmological effects such as the mass of neutrinos.

Using an unprecedently large sample of ˜14,000 BOSS quasars from the SDSS DR9, the most stringent constraints to date on the mass of warm dark matter particles and the sum mass of neutrinos were obtained using the Lyman-alpha flux power spectrum. I will centre this talk around the impact of kilo-electronvoltaic dark matter particles on cosmology, and how the Lyman-alpha flux power spectrum was constructed and used to establish mass constraints for thermally produced particles and non-resonantly produced sterile neutrinos.

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