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Analytic covariance of the galaxy power spectrum

A robust analysis of the covariance of the galaxy power spectrum is crucial for cosmological parameter estimation. The traditional process of obtaining the covariance involves simulating thousands of mocks. I will present an analytic approach for the covariance matrix which is more than four orders of magnitude faster than mocks. The dominance of shot noise at quasi-linear scales greatly simplifies the analytic approach and makes it useful for future surveys like DESI and Euclid.

First astrophysical constraints on dark matter interactions with ordinary matter at low relative velocity

I will present constraints on DM-ordinary matter interactions at $v_{\text{relative}} \sim 17$ km/s, by requiring that the heating/cooling due to DM interacting with gas in the Leo T dwarf galaxy not exceed the radiative cooling rate of the gas. This imposes strong limits on sub-GeV millicharged DM and also gives the strongest bounds to date on ultra-light hidden photon DM for the mass range $10^{-23} < m_{DM} < 10^{-10}$ eV.