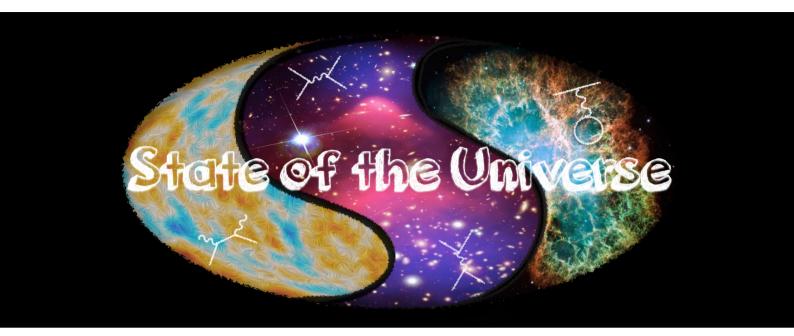
## **Department of Theoretical Physics**



## Jay Wadekar New York University

Friday, 3 January 2020, 11:30, Room A304

## 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  $v_{relative} \sim 17$  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.

