TSF09-2009-000187

Abstract for an Invited Paper for the TSF09 Meeting of the American Physical Society

Profiting from the Inflationary Universe with the Hobby-Eberly Telescope Dark Energy Experiment KARL GEBHARDT, University of Texas at Austin

Observations over the next decade will be focused on studying the expansion history of the universe, given that we have little conception for what drives the expansion either at late times (i.e., the nature of dark energy) or early times (i.e., inflation). I will describe an observational approach to studying both epochs of expansion that relies on measuring the power spectrum of galaxies as obtained from a large redshift survey: the Hobby-Eberly Telescope Dark Energy Experiment (HETDEX), a ground-based study already taking data. While planned experiments are designed to understand expansion, we must seize on the opportunities offered for other studies, especially given the difficulty in predicting implications for dark energy. One exciting aspect of HETDEX is that the primary instrument is and will continue to be unique for studies of black holes and dark matter profiles in galaxies. The latest results for both the dark matter profiles and black holes show important trends that impact theories of galaxy formation and black hole growth. Thus, the inflationary universe has much to offer.