Abstract Submitted
for the TSF15 Meeting of
The American Physical Society

**Inflationary Spectra with quantum corrections in loop quantum cosmology** TAO ZHU, CASPER, Baylor University, ANZHONG WANG, GCAP-CASPER, Physics Department, Baylor University, GERALD CLEAVER, EUCOS-CASPER, Physics Department, Baylor University, KLAUS KIRSTEN, QIN SHENG, GCAP-CASPER, Mathematics Department, Baylor University, QIANG WU, Institute for Advanced Physics  Mathematics, Zhejiang University of Technology — Loop quantum cosmology (LQC) provides promising resolutions to the trans-Planckian issue and initial singularity arising in the inflationary models of general relativity. In general, LQC involves two types of quantum corrections, the holonomy and inverse-volume, to both of the cosmological background evolution and perturbations. In this work, using the uniform asymptotic approximations, we derive explicitly the observational quantities of the slow-roll inflation in the framework of LQC with these quantum corrections. We calculate the power spectra, spectral indices, and running of the spectral indices for both scalar and tensor perturbations, represent the most accurate results obtained so far in the literature. It is also shown that with the inverse-volume corrections, both scalar and tensor spectra exhibit a deviation from the usual shape at large scales. Then, using the recent released Planck data, we obtain new constraints on quantum gravitational effects from LQC corrections, and find that such effects could be within the detection of the forthcoming experiments.

Tao Zhu
CASPER, Baylor University

Date submitted: 09 Oct 2015 Electronic form version 1.4