Abstract Submitted
for the NWS09 Meeting of
The American Physical Society

Cosmological tests of GR – a look at the principals LEVON POGOSIAN, GONG-BO ZHAO, Simon Fraser University, ALESSANDRA SILVERSTRI, MIT, JOEL ZYLBERBERG, UC Berkley — Future cosmological surveys, through combination of galaxy counts and weak lensing measurements, will have the ability to map the evolution of matter perturbations and gravitational potentials from the matter dominated epoch until today. In addition to significantly tightening the existing bounds on allowed expansion histories, they will test the relationships between matter overdensities, local curvature, and the Newtonian potential. These relationships, given by Einstein's equations of General Relativity, can be modified in alternative gravity theories, or by the effects of massive neutrinos or exotic forms of Dark Energy. In this study, we introduce two arbitrary functions of time and scale which can account for any of the above departures from "normal" growth in the linear regime. We then use the Principal Component Analysis (PCA) to find the eigenmodes of these two functions which surveys like DES and LSST, in combination with CMB and SNe data, will constrain. The scale and time dependence of these eigenmodes can tell us which theoretical models will be better tested. The number of well-constrained modes is roughly equal to the number of additional growth parameters, beyond w(z), that one will be able to measure with future data.

Levon Pogosian
Simon Fraser University

Date submitted: 08 Apr 2009 Electronic form version 1.4