

APR06-2006-020015

Abstract for an Invited Paper
for the APR06 Meeting of
the American Physical Society

Emergence of the standard model from quantum gravity

LEE SMOLIN, Perimeter Institute for Theoretical Physics

Recent developments in loop quantum gravity (LQG) are presented which have implications for experiment. First a review is given of the basic ideas and principles which underlie loop quantum gravity which is a non-perturbative approach to unifying gravity and relativity with quantum theory. The main results are then reviewed, with emphasis on those that establish the finiteness of the theory and the discreteness of quantum geometry. A brief survey is then given of recent applications to black holes, the very early universe and high energy astrophys experiments such as AUGER and GLAST. The last part of the talk will then introduce recent results which show that, given certain assumptions, the low energy excitations of the quantum gravity theory have fermionic states which coincide with the fermions of the standard model.