Perturbation Theory in Covariant Canonical Quantization
SAYANDEB BASU, Physics Department, University of California, Davis — I investigate a new idea of perturbation theory in covariant canonical quantization. This idea is motivated by computability of the "evolving constants" idea introduced by Rovelli—an outstanding obstacle to which has been the lack of exact general solutions in 3+1 dimensional general relativity. I present preliminary results for a toy model of a harmonic oscillator with a quartic perturbation, and show that this method reproduces the quantized spectrum of standard quantum theory. This result indicates that when the exact solutions to classical equations are not known, covariant canonical quantization via perturbation theory could be a viable approximation scheme for finding observables, and suggests a physically interesting way of extending the scope of covariant canonical quantization in quantum gravity.

Sayandeb Basu
Physics Department, University of California, Davis

Electronic form version 1.4