Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Consistent quantum prediction and decoherence in quantum cosmology DAVID CRAIG[1], Le Moyne College and Perimeter Institute for Theoretical Physics — A complete "consistent histories" framework for certain symmetry-reduced models of quantum gravity is given, within which probabilities may be consistently extracted from quantum amplitudes. The decoherence functional for both a standard "Wheeler-DeWitt" quantization and a loop quantization of a flat Friedmann-Robertson-Walker cosmological model is constructed, from which consistent quantum predictions may be made in mathematically precise models of quantum cosmologies. Consistent (decoherent) families of histories are exhibited, with an emphasis on the crucial role played by the decoherence of histories in arriving at self-consistent quantum predictions for these closed quantum systems. By way of example, the problem of resolution of the classical "big bang" singularity is compared and contrasted in these two models. Special attention is given to consistent quantum predictions in these theories which are *certain i.e.* predictions for which the problem of interpretation of probabilities for a closed quantum system is not present.

[1]Based in part on joint work with Parampreet Singh, LSU.

David Craig
Le Moyne College and Perimeter Institute for Theoretical Physics

Date submitted: 10 Nov 2011 Electronic form version 1.4