

Deformation Quantization for the $SL(2, \mathbb{R})$ model of gravity

Within the Deformation quantization scheme we investigate the Wigner function for a finite dimensional constrained Hamiltonian system that stands for a simplified model of general relativity. The classical theory is characterized by the gauge group $SL(2, \mathbb{R})$ and an observable algebra constructed by its dual pair $\mathfrak{o}(p, q)$. At the quantum level, the gauge symmetry is incorporated through an specific interpretation of the Schrödinger star-genvalue equations which in turn brings into play a well-behaved Wigner function. In particular, we are able to find the associated wave functions and we also discuss how the Wigner-Weyl map may be redefined in order to produce gauge invariant quantum states as compared to refined algebraic quantization.