1167-81-22 **Tepper L Gill***, tgill@howard.edu. *Correct Hilbert space for the Feynman Formulation of Quantum Mechanics.*

The Feynman formulation of quantum mechanics created two mathematical problems, which are dual of each other. The first problem was recognized immediately because there existed no theory that could provide rigorous meaning for the path integral suggested by Feynman. Approaches to this problem generated extensive research with inconclusive limited outcomes and has lost favor in the mathematics community. However, in the physics community, the study and applications of path integrals has expanded to include quantum liquids, quantum gravity and condensed matter physics to name a few. The dual problem is that the kernel for the Feynman path integral in not in $L^2[\mathbb{R}^n]$, the standard space for quantum mechanics.

The purpose of this talk is to introduce the Kelubs-Steadman Hilbert space, $KS^2[\mathbb{R}^n]$. This separable Hilbert space contains all non-absolutely integrable functions, the space of distributions $\mathcal{D}'$ and $L^2[\mathbb{R}^n]$ as a continuous embedding. Showing that both the convolution and Fourier transform extend to bounded linear operators on $KS^2[\mathbb{R}^n]$ is sufficient for the Feynman formulation of quantum mechanics and the construction of the path integral in the manner suggested by Feynman. (Received January 28, 2021)