Decoding Feynman's Path-Integral via Minkowski Space

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In Non-relativistic quantum mechanics the origin of the phase of kernels is motivated by the need for waves, but the physical origin of waves is obscure. In his path-integral, Feynman cleverly maps phase onto paths by invoking a complex weight for paths based on the classical path action. The complex phase converts a Wiener integral that is well motivated in classical statistical processes, into a very different object. The complexification of the path weight averages phase as a function of position and time rather than just the likelihood of position. One possibility is that the non-relativistic path integral actually inherits its phase from the Lorentz transformation and that the underlying presence of time-dilation propagates up to the deBroglie scale via the geometry of Minkowski space. This note verifies this claim and clarifies some issues concerning mass in Minkowski space.