

From qubits and actions to the Pauli-Schroedinger equation

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Here I show that a classical or quantum bit state plus one simple operation, an action, are sufficient ingredients to derive a quantum dynamical equation that rules the sequential changes of the state. Then, by assuming that a freely moving massive particle is the qubit carrier, it is found that both, the particle position in physical space and the qubit state, change in time according to the Pauli-Schroedinger equation. So, this approach suggests the following conjecture: because it carries one qubit of information the particle motion has its description enslaved by the very existence of the internal degree of freedom. It is compelled to be no more described classically but by a wavefunction. I also briefly discuss the Dirac equation in terms of qubits.

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