1096-81-587 **Chandrashekar Channipura Madaiah*** (c.madaiah@oist.jp), 1919-1, Tancha, OIST, Quantum Systems Unity, Onna-son, Okinawa 9040495, Japan, and **Thomas Busch**. *Quantum walk as secured quantum memory.*

At a first look a dynamical process like a quantum walk appears to be an unlikely candidate for a quantum memory, since it results in nontrivial quantum correlations between the particle (qubit) and the position space. In this talk we present a careful analysis of the dynamics and show that the stored information of a qubit can be perfectly recovered at specific times t which are periodic and a function of coin parameter θ, used for evolving the walk. Due to the spatial spread of the qubit in position space, the information stored will also acquire an inherent level of security from an eavesdropper.

Though in principle this model describes a fully functioning quantum memory, the dependency of the recovery time t on θ and a linear increase in size of the position space required to store the information of the qubit poses an unwelcome and limiting restriction. By amending the protocol we show that one can recovery of the information at any time and independent of θ. Our protocol can be adopted to any quantum system for which experimental control over quantum walk dynamics can be achieved.

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