# Non-reversal Open Quantum Walks

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A new model of non-reversal quantum walk is proposed. In such a walk, the walker cannot go back to previously visited sites but it can stay static or move to a new site. The process is set up on a line using the formalism of Open Quantum Walks (OQWs). Afterwards, non-reversal quantum trajectories are launched on a 2-D lattice to which a memory is associated to record visited sites. The "quantum coins" are procured from a randomly generated unitary matrix. The radius of spread of the non-reversal OQW varies with different unitary matrices. The statistical results have meaningful interpretations in polymer physics. The number of steps of the trajectories is equivalent to the degree of polymerization, $N$. The root-mean-square of the radii determines the end-to-end distance, $R$ of a polymer. These two values being typically related by $R \sim N^{\nu}$, the critical exponent, $\nu$, is obtained for $N \leq 400$. It is found to be closely equal to the classical Flory exponent. However, for larger $N$, the relationship does not hold anymore. Hence, a different relationship between $R$ and $N$ is suggested.