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Decoherence and Quantum Walks under the regime of weak measurements and weak values DEBABRATA GHOSHAL, George Mason University, MARCO LANZAGORTA, ITT Corporation, SALVADOR VENEGAS-ANDRACA, Tecnológico de Monterrey Campus Estado de México — Our research on Quantum Walks under the regime of quantum weak measurements and weak values (QWWM) is being continued from the perspective of quantum algorithms. Previously we investigated several statistical measures of a QWWM on an infinite line, and did some comparative study of such results with corresponding classical and quantum walks position probability distributions and statistical measures. Now we are interested to show the entanglement and decoherence effects of QWWM. We show preliminary results with respect to how the performance of Grover's algorithm is affected by entangled qubits when decoherence happens due to temperature difference. Furthermore, we provide a physical interpretation of such decoherence of the QWWM so that our results could have some useful applications in the area of quantum information.

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