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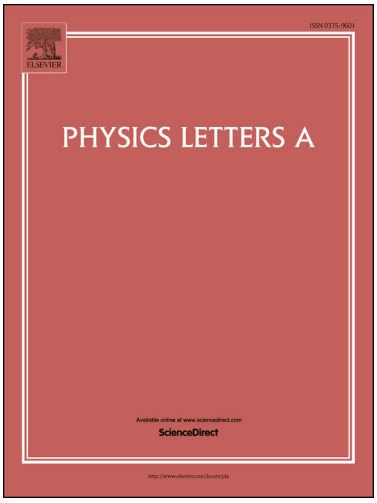

Unidirectional quantum walk of two correlated particles: Manipulating bound-pair and unbound wave-packet components

A.R.C. Buarque, W.S. Dias

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Highlights

- Bound-pair state component behaves differently from unbound states when subjected to an external pulsed electric field;
- Strongly entangled particles exhibit a quite distinct dynamics when compared to a single particle system;
- Particle-particle interaction induces the splitting of the initial wavepacket into two branches that propagate with specific directions and drift velocities;
- With a proper external field tunning, the wave-packet components can perform an unidirectional transport on the same or opposite directions.
- The amplitude of each mode is related to the degree of entanglement betweem particles, which presents a non-monotonic dependence on the interaction strength.

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