

## **Abstract**

We look at two possible routes to classical behavior for the discrete quantum random walk on the integers: decoherence in the quantum “coin” which drives the walk, or the use of higher-dimensional (or multiple) coins to dilute the effects of interference. We use the position variance as an indicator of classical behaviour, and find analytical expressions for this in the long-time limit; we see that the multicoin walk retains the “quantum” quadratic growth of the variance except in the limit of a new coin for every step, while the walk with decoherence exhibits “classical” linear growth of the variance even for weak decoherence.