

1167-47-215

**Wei Wang** (wang9585@umn.edu) and **Shiwen Zhang\*** (zhan7294@umn.edu). *The exponential decay of eigenfunctions for tight binding Hamiltonians via landscape and dual landscape functions.*

In this talk, we consider the discrete Schrödinger operator  $H = -\Delta + V$  on a discrete lattice, with periodic or Dirichlet boundary conditions. We use a hidden landscape function  $u$ , defined as the solution of an inhomogeneous boundary problem with uniform right-hand side for  $H$ , to predict the location of the localized eigenfunctions of  $H$ . Explicit bounds on the exponential decay of Agmon type for low energy modes are obtained. We also show that exponential decay estimates of Agmon type appear near the top of the spectrum, where the location of the localized eigenfunctions is predicted by a dual landscape function. Our results are deterministic and are independent of the size of the domain. We will also discuss numerical experiments to confirm the conditional results effectively, for some random potentials. The talk is based on joint work with Wei Wang. (Received March 08, 2021)