Inverse scattering for discrete Schrödinger operators

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We consider the discrete Schrödinger operator $-\Delta + V$ on the square lattice $\mathbf{Z}^d$, where V is a compactly supported potential, and show that V is uniquely reconstructed from the S-matrix of a fixed energy in a suitable energy region. We reduce this inverse scattering problem to an inverse boundary value problem in a bounded domain by showing the equivalence of S-matrix and D-N map. The proof follows the idea of the continuous case, however, there are lots of subtlety in the discrete case. We also mention the related results for the hexagonal lattice. These are the (joint) works of (with) E. Korotayev, H. Morioka, K. Andou and myself.