

We propose a protocol for realizing stripe phases in two spin models (Ising and Heisenberg type Hamiltonians, whose phase diagrams include the stripe phase) on a two dimensional square lattice. First, the state preparation is performed by (cluster) mean-field time-dependent variational ansatz (validated by comparison with exact results for small systems). We then discuss how to simulate the proposed Hamiltonians by encoding spin states into Zeeman sublevels of the ground state manifold of strongly magnetic atoms (Cr, Dy, Er, etc.). This method allows one to estimate the time required for the preparation of the stripe phase with high fidelity under real experimental conditions.