



Simulation of Z_2 model using Variational Autoregressive Networks (VAN)

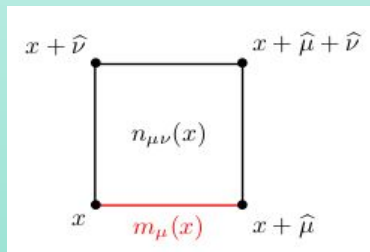
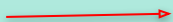
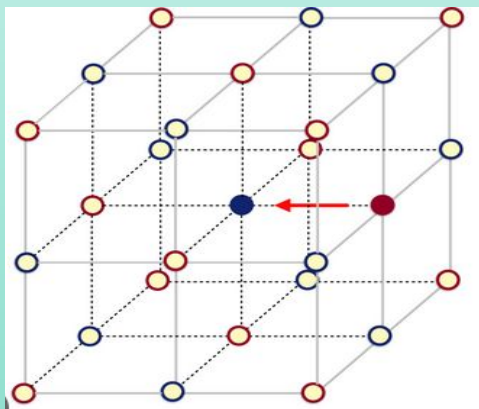
Neural Networks for Local Abelian Gauge Symmetry

Vaibhav Chahar

M.Smoluchowski Institute of Physics, Jagiellonian University

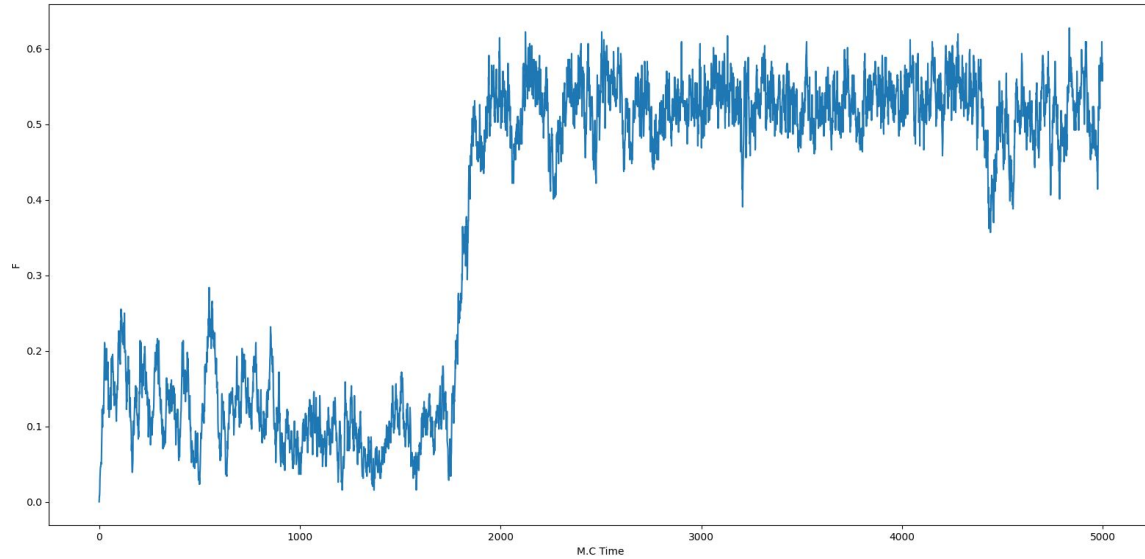
Description of the Model

- The model is a discrete Z_2 Abelian gauge model on a 4D hypercubical lattice.
- Closely related to ising model, shows a phase transition with decreasing temperature.



Hamiltonian:
$$H(\sigma) = \frac{1}{6} \sum_{i,j,k,\ell} P_{ijkl} (1 - \sigma_i \sigma_j \sigma_k \sigma_\ell)$$

Problems with Monte-Carlo



Variational Autoregressive Network (VAN)

- Variational Autoregressive Network (VAN) used as a mechanism of providing uncorrelated proposals in a Monte Carlo simulation.
- The idea to use self-learning neural network as a sampler for MCMC called Neural Markov Chain Monte Carlo (NMCMC).
- Two models are used: Fully Connected Autoregressive Network and PixelCNN.

