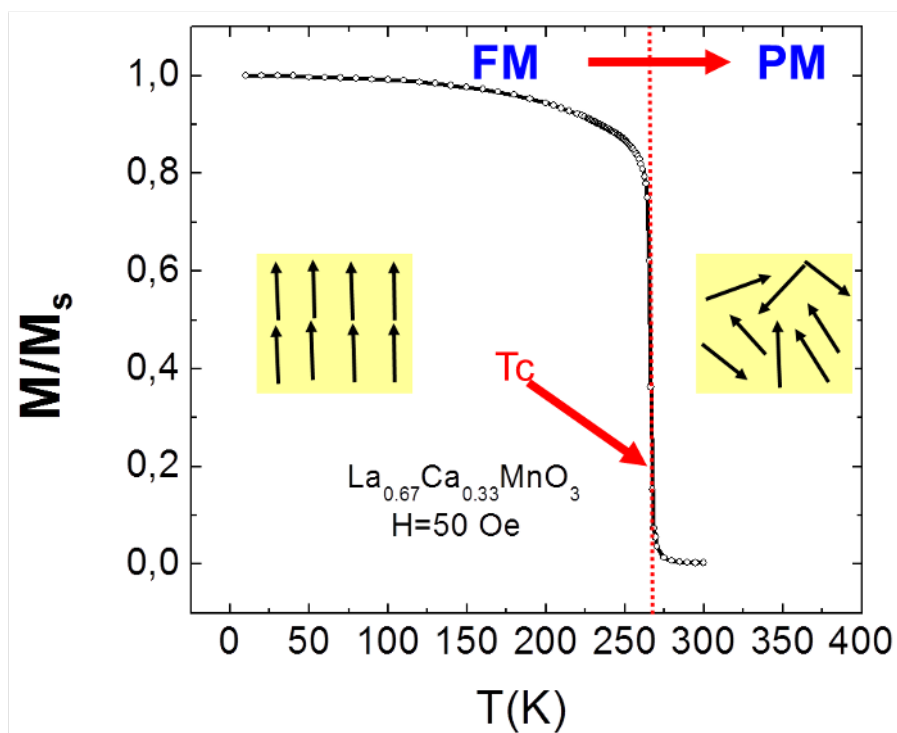# Contents

Chapter 1

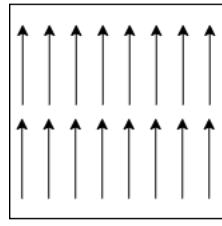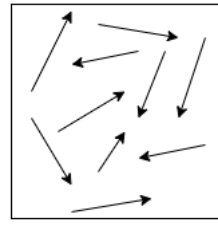# Ferromagnetism and the Ising Model

1.1 Ferromagnetism

1.2 Ising Model

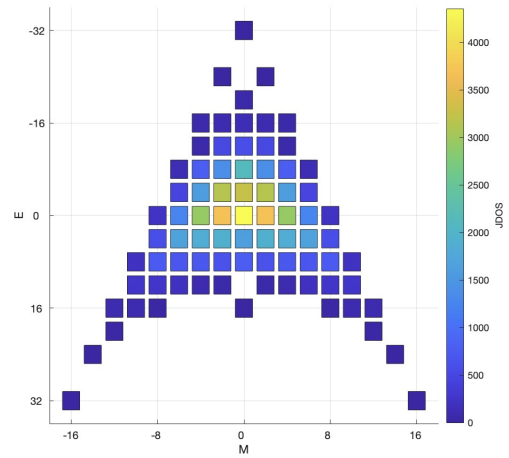### 1.2.1 Joint Density of States

1.2.2 Thermodynamics

1.2.3 Relevance
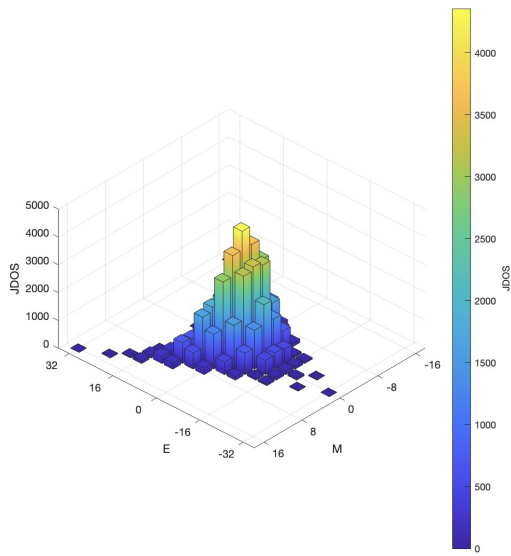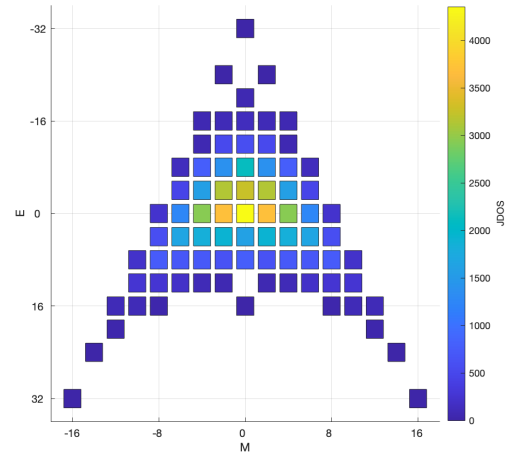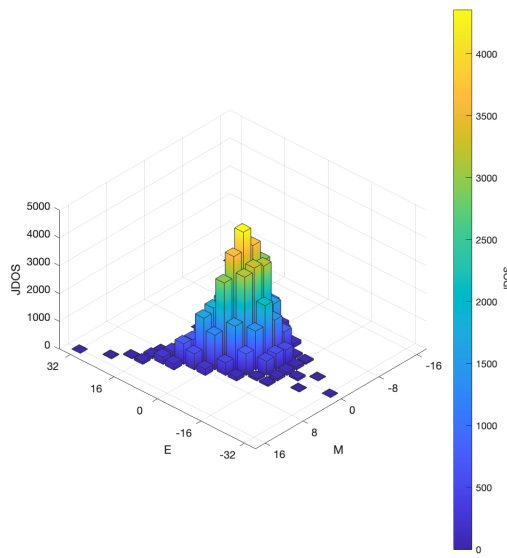
Ferromagnetic Phase
T < Tc
Low Entropy

Paramagnetic Phase
T > Tc
High Entropy

Chapter 2

Monte Carlo Methods Applied to the Ising Model

2.1 Metropolis

2.1.1 Critical Slowing Down

2.2 Wang-Landau

2.2.1 Algorithm

2.2.2 Variations

2.2.3 Success and Limitations

Chapter 3

Flat Scan Sampling

Chapter 4

Thermodynamics and Finite Size Scaling

Chapter 5

Conclusion and Future Work