

# Assignment 3

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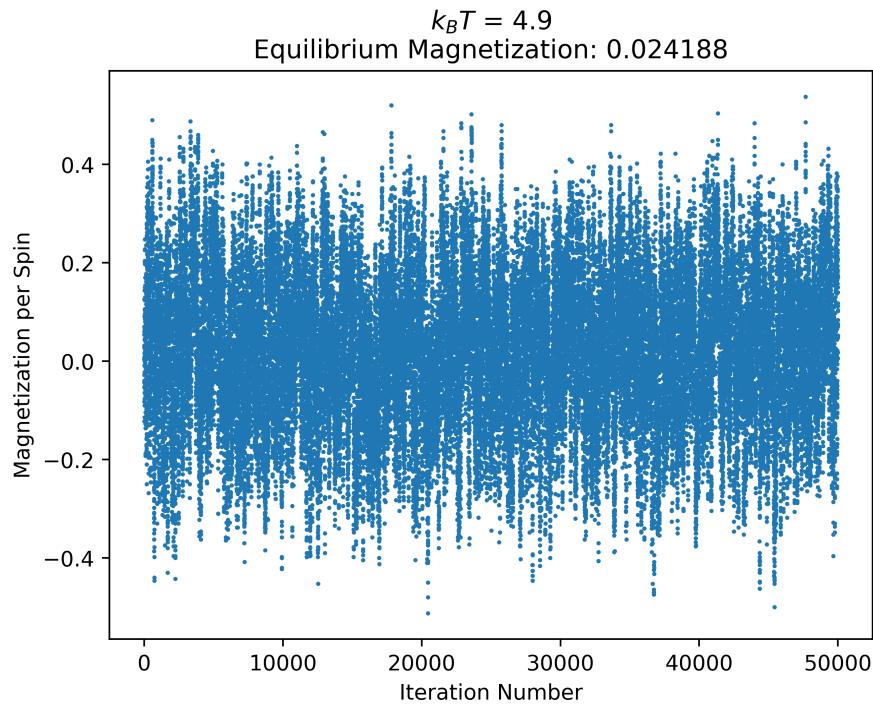
**1**

The total magnetic moment will be  $-L^3$  or  $-8000$ .

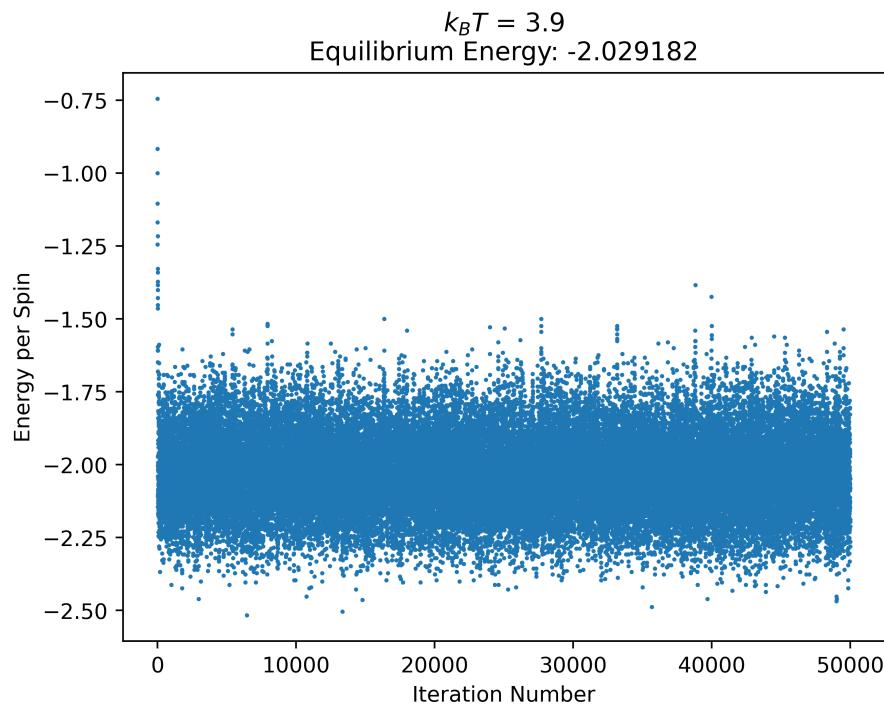
**2**

The number of interactions is 6 per spin and thus  $6L^3/2 = 3L^3$ . Since all interactions will contribute to  $-J$  interaction energy, the total energy will be  $-3JL^3 = -3000$ .

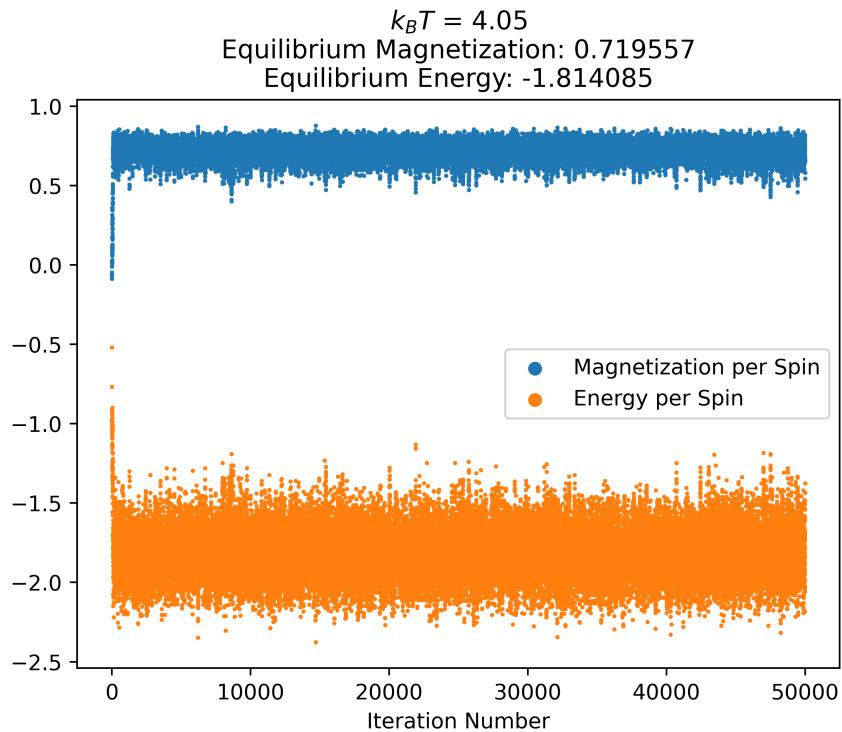
**3**

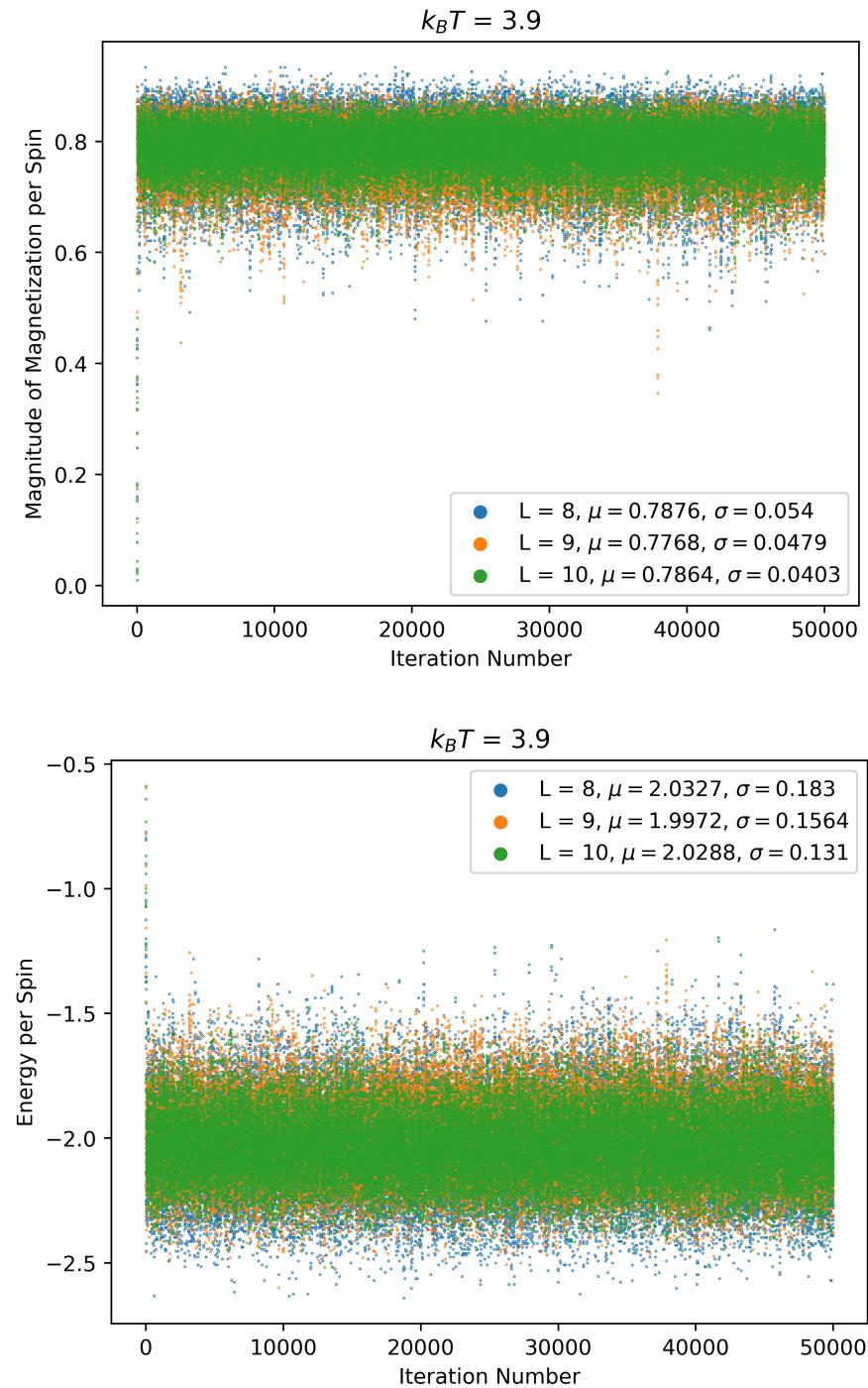


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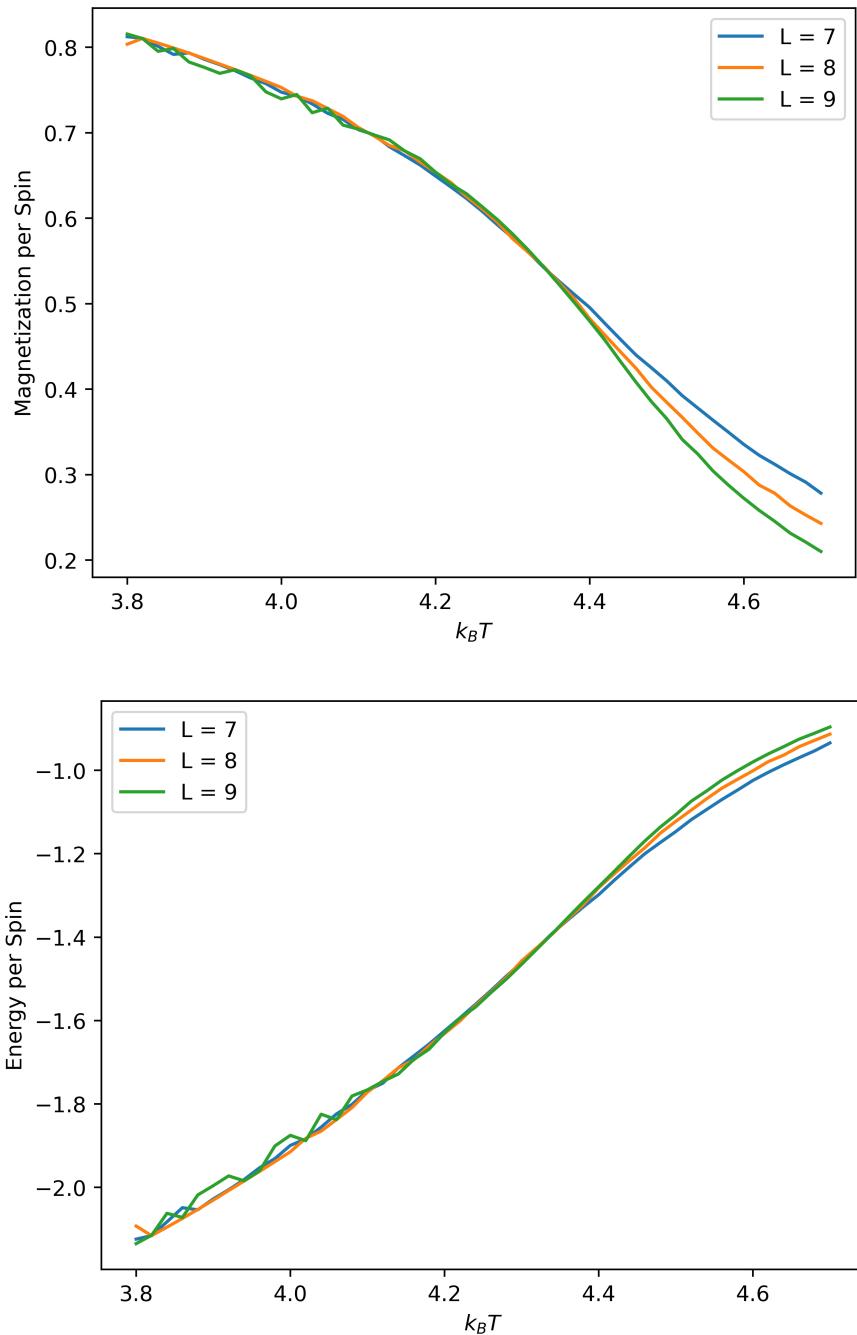


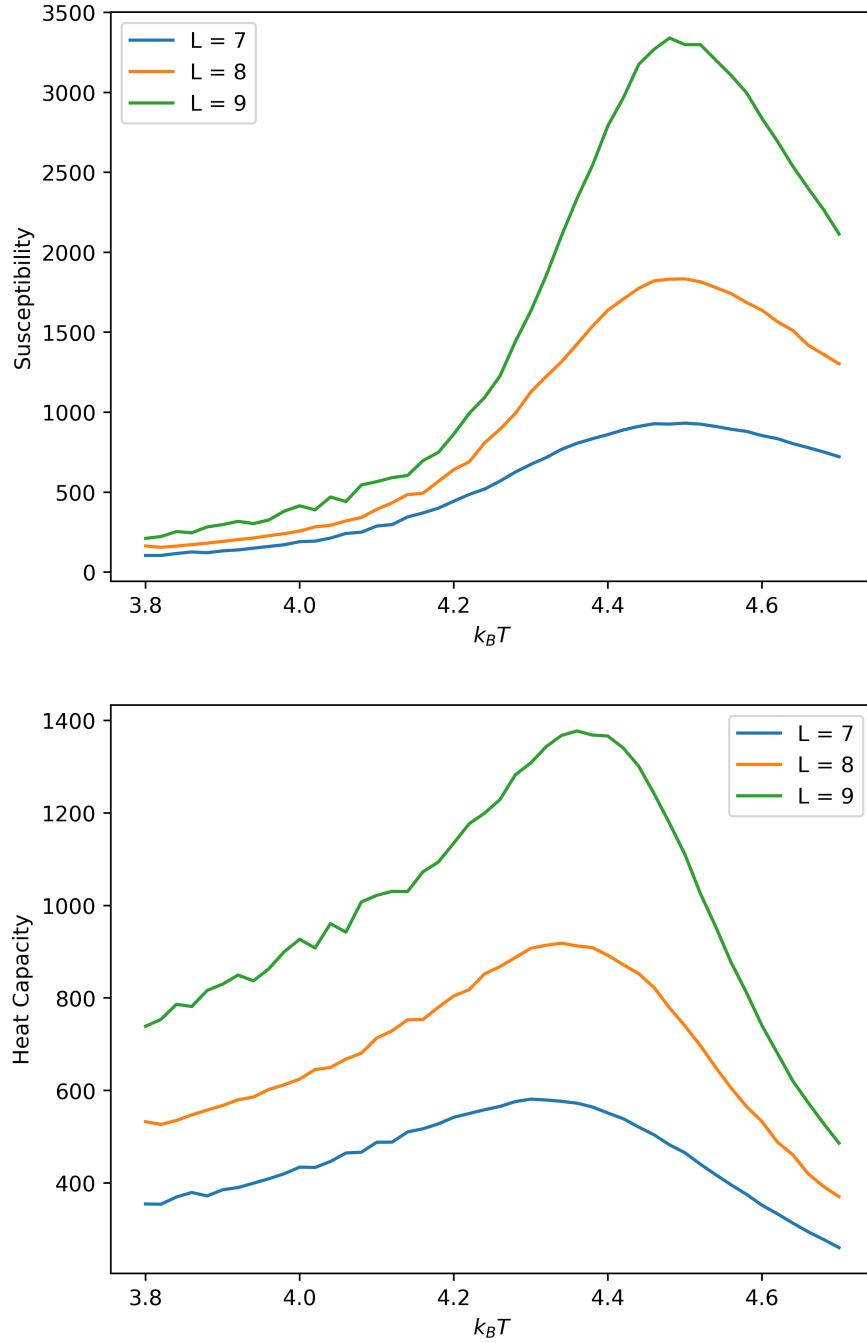
5





## Figures





7

The value of  $\chi$  at  $T = 4.5$  for  $L = 7, 8, 9$  respectively are 931.82, 1833.69, 3298.23 .

8

The peak value of  $C_V$  for  $L = 8$  is 918.39 .

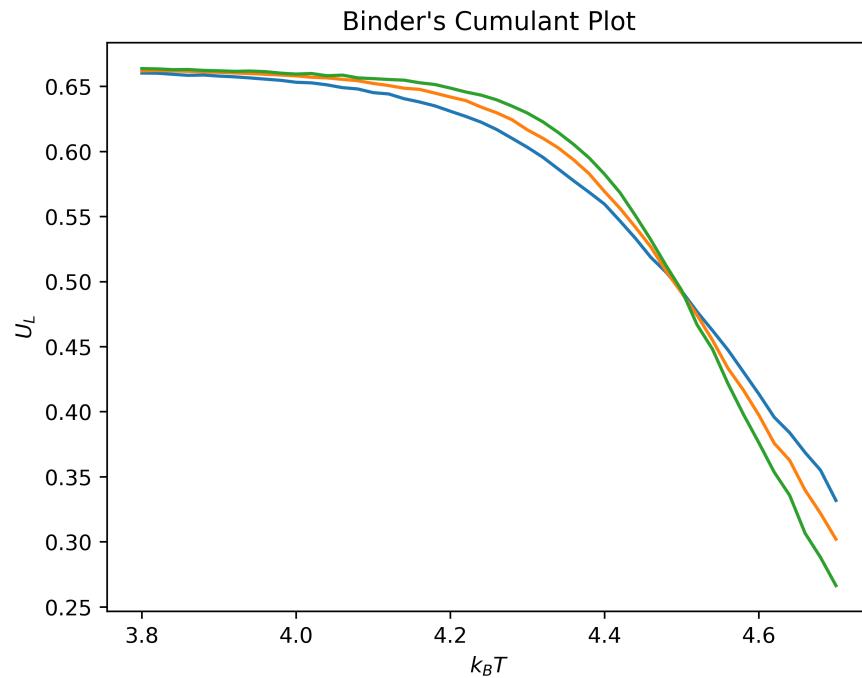
**9**

The peak value of  $C_V$  for  $L = 9$  is 1377.19 .

**10**

The value of magnetization per spin for  $L = 7$  at  $T = 3.8$  is 0.81 .

**11**



**12**

By detailed balance, we must have

$$n_A r_{A \rightarrow B} = n_B r_{B \rightarrow A}$$

Hence, 20 particles must be jumping from  $E_{10}$  to  $E_5$ .