Esercizio simulazione Monte-Carlo
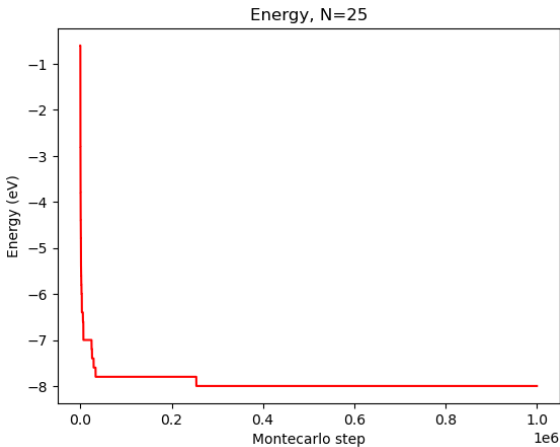
Lorenzo Tasca

Dipartimento di Fisica "Giuseppe Occhialini"
Università degli Studi di Milano-Bicocca

Aprile 2024
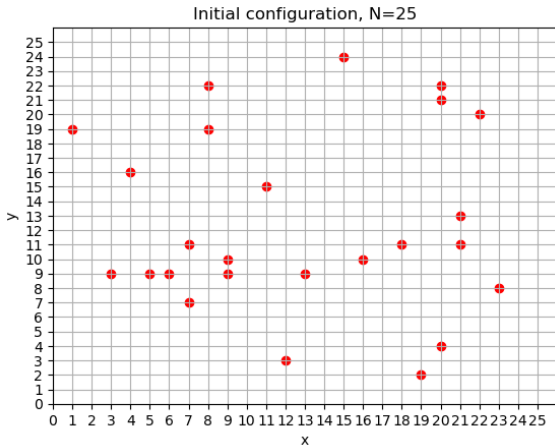
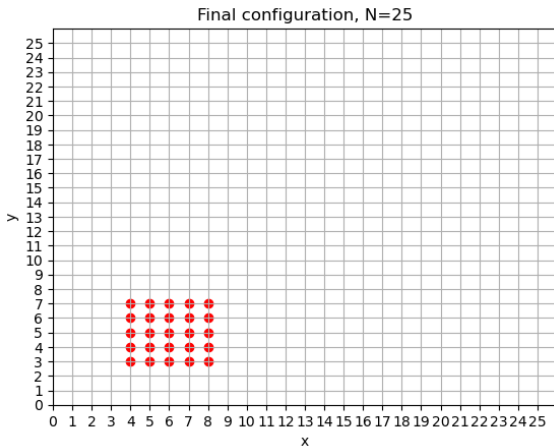# Zero temperature MC, minimum energy configuration

$$N = 25, E_{min} = -8 \, eV$$

Energy, N=25

Zero temperature MC, minimum energy configuration

$$N = 25, E_{min} = -8 \, eV$$

Initial configuration, N=25

Zero temperature MC, minimum energy configuration

$$N = 25, E_{min} = -8\,eV$$

Final configuration, N=25

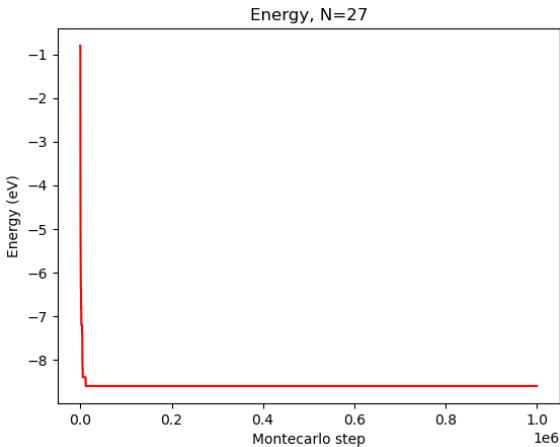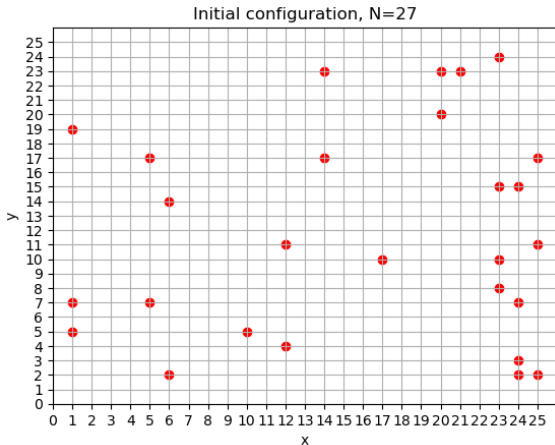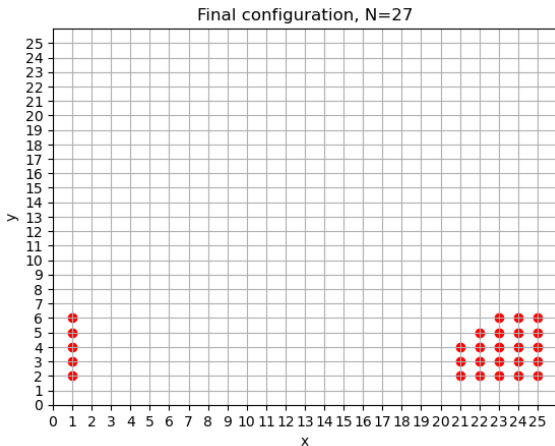# Zero temperature MC, minimum energy configuration

$$N = 27, E_{min} = -8.6\,eV$$

Zero temperature MC, minimum energy configuration
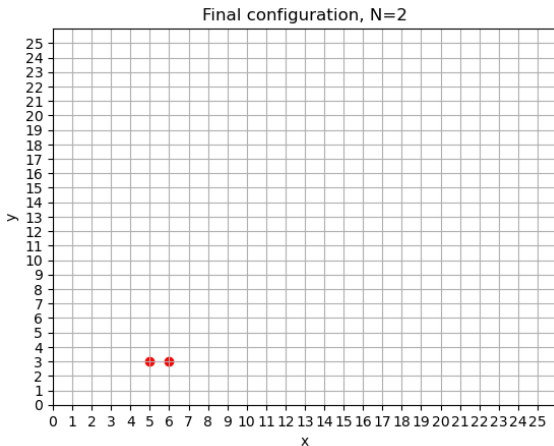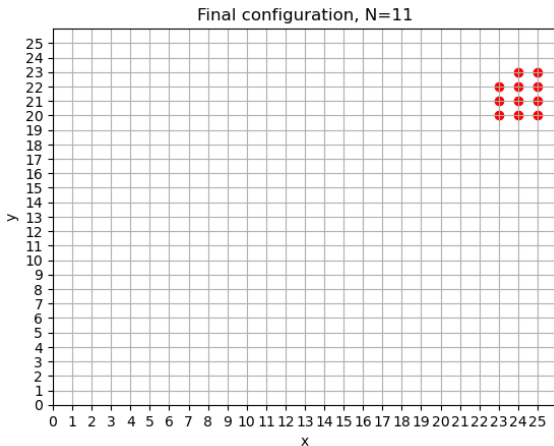
$$N = 27, E_{min} = -8.6 \, eV$$

Initial configuration, N=27

Zero temperature MC, minimum energy configuration

$$N = 27, E_{min} = -8.6 \, eV$$

Final configuration, N=27

Zero temperature MC, minimum energy configuration

Obtain minimum energy configuration for different values of N

Final configuration, N=2

Zero temperature MC, minimum energy configuration

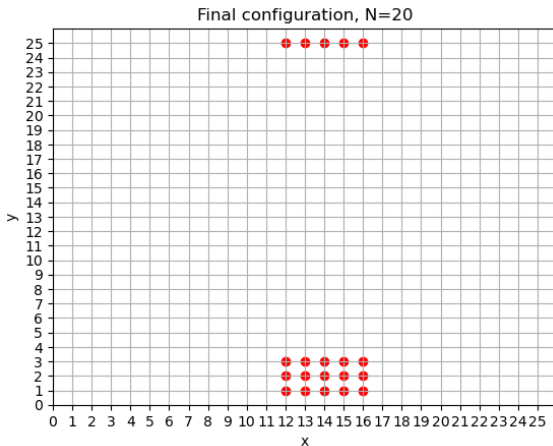Obtain minimum energy configuration for different values of N

Final configuration, N=11

Zero temperature MC, minimum energy configuration

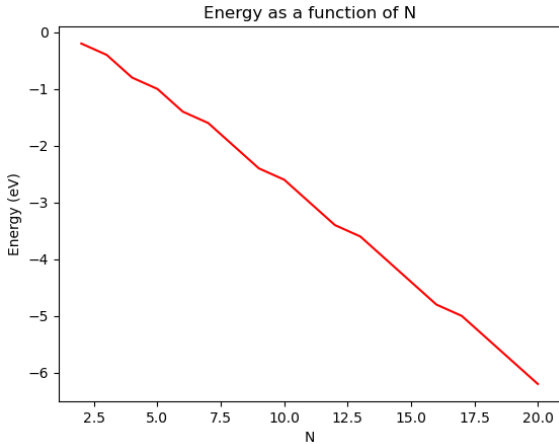Obtain minimum energy configuration for different values of N

Final configuration, N=20

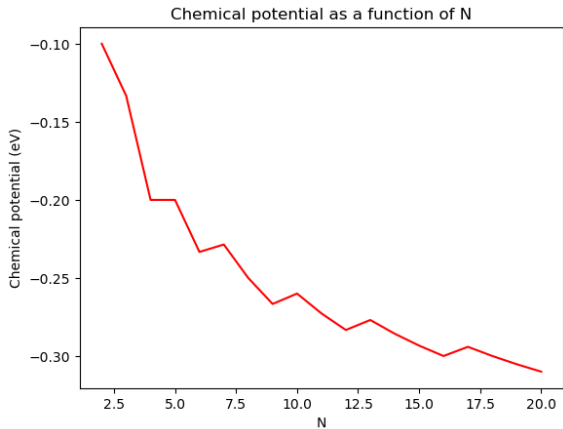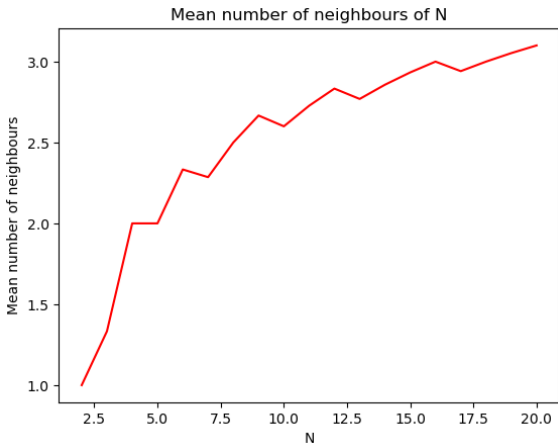# Zero temperature MC, energy variation with N

Energy as a function of N

Zero temperature MC, μ variation with N

Chemical potential as a function of N

Zero temperature MC, number of neighbours variation with N

Mean number of neighbours of N

Finite temperature MC, $L = 25$

$$T = 4\,K$$

Thermalization, L=25, T=4

Finite temperature MC, $L = 25$

$$T = 4\,K$$

Energy, L=25, T=4

Finite temperature MC, $L = 25$

$$T = 604\,K$$

Thermalization, L=25, T=604
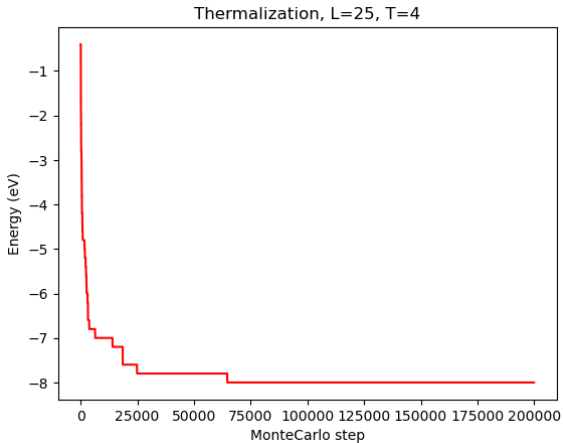
Finite temperature MC, $L = 25$

$$T = 604\,K$$
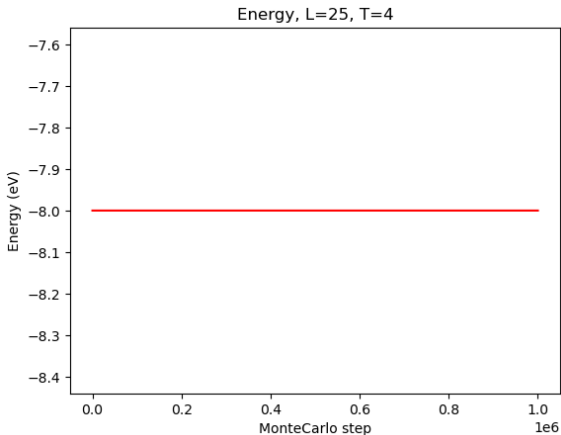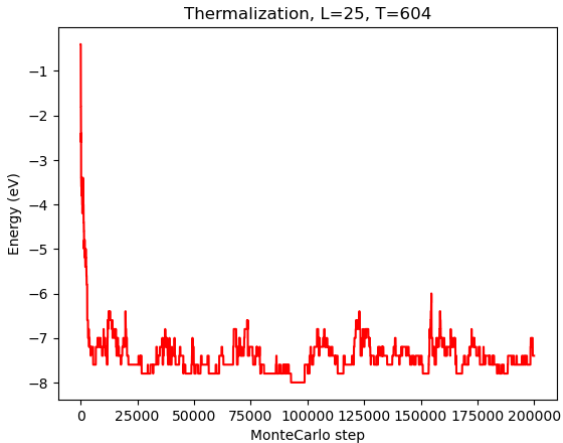
Energy, L=25, T=604
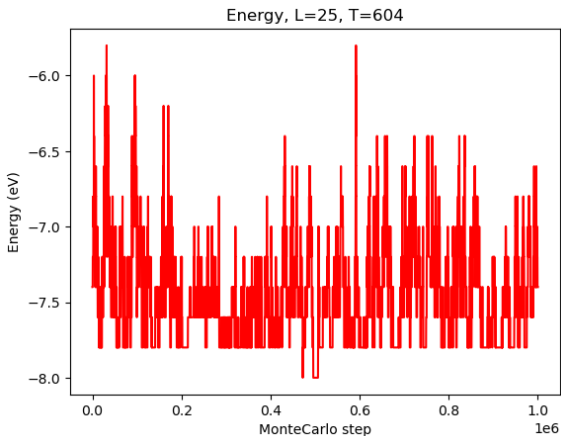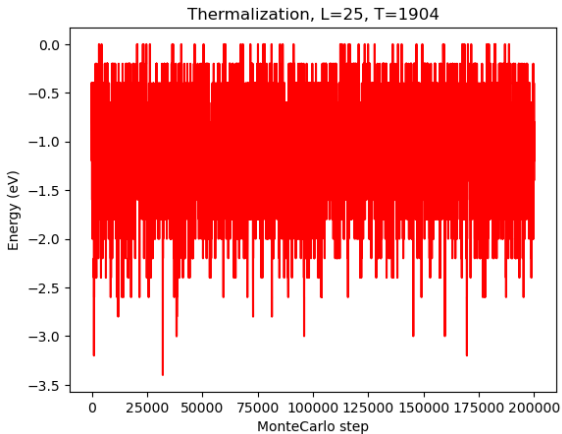
Finite temperature MC, $L = 25$

$$T = 1904\,K$$

Finite temperature MC, $L = 25$

$$T = 1904\,K$$

Energy, L=25, T=1904
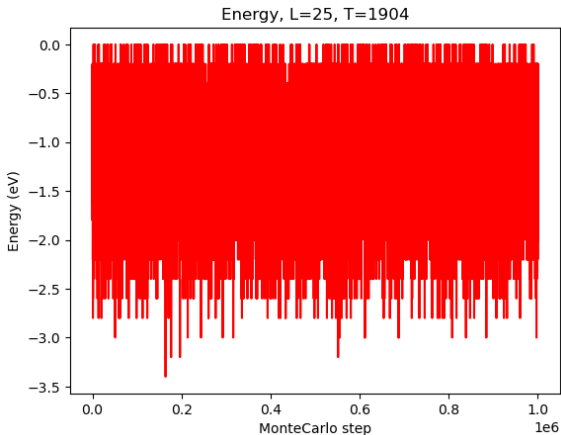
Finite temperature MC, $L = 15$

Mean energy variation with temperature

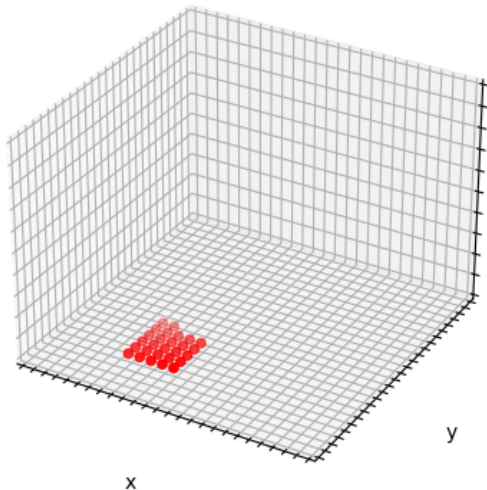Energy as a function of T, L=15
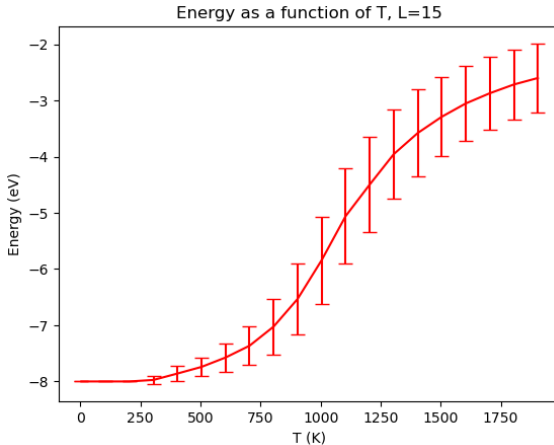
Finite temperature MC, $L = 25$

Mean energy variation with temperature
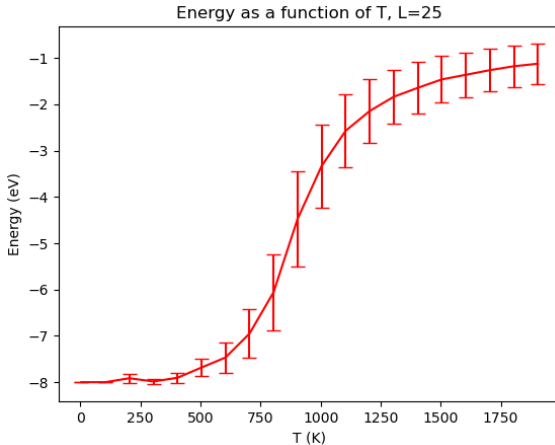
3 dimensional MC, $N = 27$
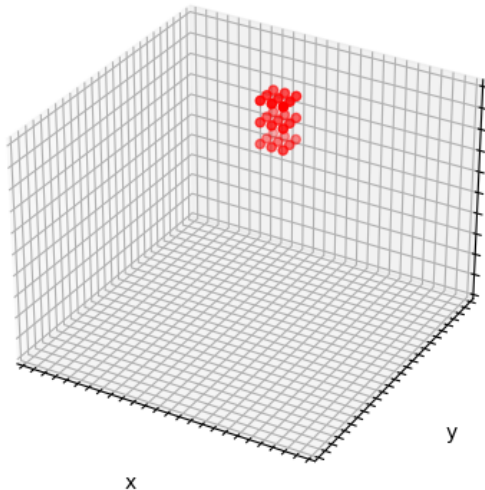
Minimum energy configuration variation with J_0

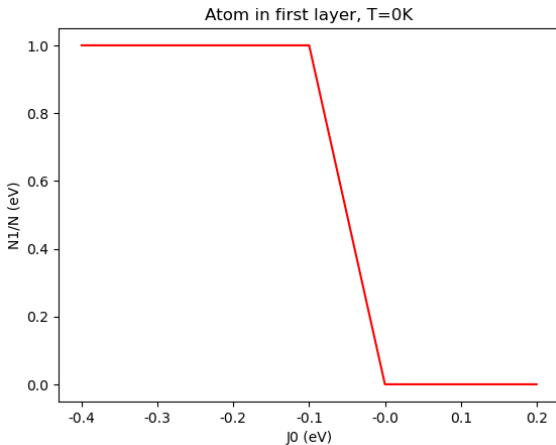Final configuration, J0=-0.1 eV

3 dimensional MC, $N = 27$

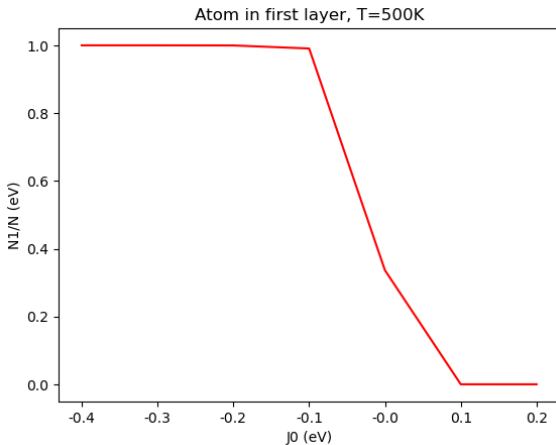Minimum energy configuration variation with J_0

Final configuration, J0=0.1 eV

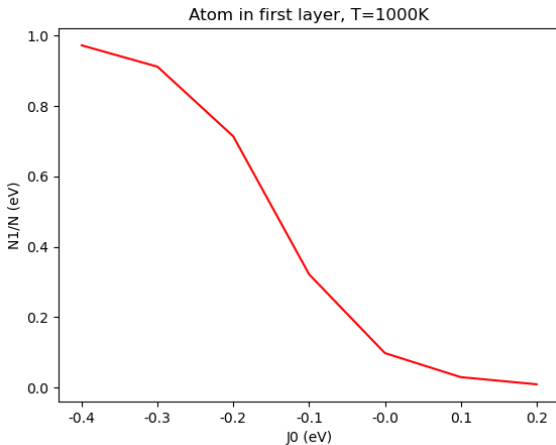# 3 dimensional MC, $N = 27$

$$N1/N @ T = 0\,K$$

Atom in first layer, T=0K

3 dimensional MC, $N = 27$

$N1/N$ @ $T = 500\ K$

Atom in first layer, T=500K

3 dimensional MC, $N = 27$

$N1/N @ T = 1000\,K$

Atom in first layer, T=1000K

3 dimensional MC, $N = 27$

$N1/N$ @ $T = 1000\,K$

Atom in first layer, T=1000K

3 dimensional MC, $N = 27$

$N1/N @ T = 1000\,K$

Atom in first layer, T=1000K