Study of topological structures in bidimensional magnetic systems

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Model and System

$$H_J = -J \sum_{<ij>} \vec{S}_i \cdot \vec{S}_J \tag{1}$$

$$H_D = \sum_{<ij>} \vec{D}_{<ij>} \cdot \vec{S}_i \times \vec{S}_j \tag{2}$$

$$H_{magneticfield} = -\vec{h} \cdot \sum_i \vec{S}_i \tag{3}$$

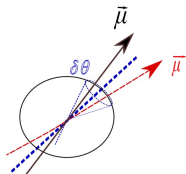$$H = H_J + H_D + H_{magneticfield} \tag{4}$$
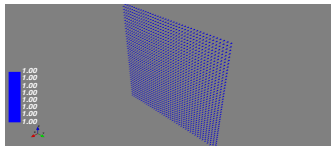

Figure: Classical
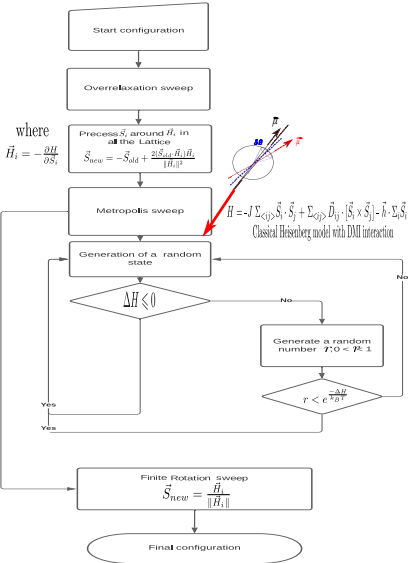Heisenberg spin
Model

Figure: System

Method

Figure: Hybrid Monte Carlo Method
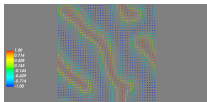
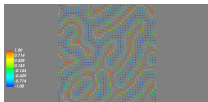# Results

Emergence of Skyrmion Lattice

Figure: D=0.6, H=0.1

Figure: D=1, H=0.1

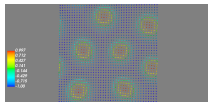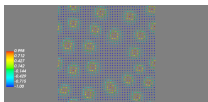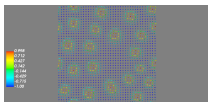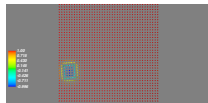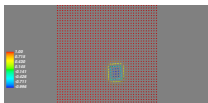
Figure: D=0.6, H=0.2

Figure: D=1, H=0.6

Figure: D=1, H=0.6

Figure: D=1,Hin=0.5

Figure: D=1,Hin=0.5

Thank you!!