A two Dimensional Realization of the VCA

VCA HAMILTONIAN

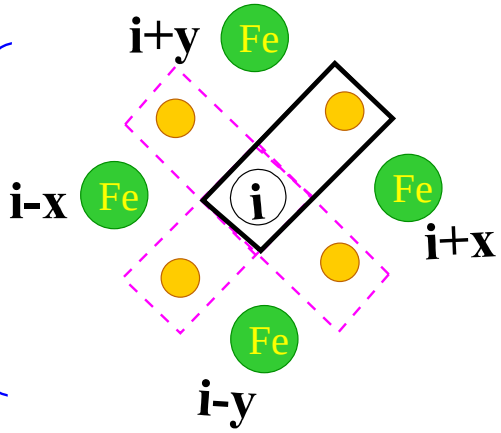
$$H = (J-\Delta)\sum_i d_i^+ d_i$$

$$+\ t_{\text{Mo-Mo}} \sum_{<i,j>} \left(< \cos\frac{\theta_{ij}}{2} > (c_{i,p}^+ c_{j,p} + c_{i,ap}^+ c_{j,ap}) - < \sin\frac{\theta_{ij}}{2} > (c_{i,ap}^+ c_{j,p} + c_{i,p}^+ c_{j,ap}) \right)$$

$$+\ t_{\text{Fe-Mo}} \sum_i d_i^+ \left[c_{i,p} + <\cos\frac{\theta_{ij}}{2}> (c_{i-x,p} + c_{i-x-y,p} + c_{i-y,p}) \right]$$

$$+\ t_{\text{Fe-Mo}} \sum_i d_i^+ \left[- < \sin\frac{\theta_{ij}}{2} > \left(c_{i-x,ap} + c_{i-x-y,ap} + c_{i-y,ap} \right) \right]$$

- To preserve the lattice symmetry, we also include the three other VCA cells.



$c_{i,p(ap)}$ destroys an electron in Mo at site i with spin parallel (antiparallel) to the direction of the Fe spin.

d_i destroys an electron in Fe at site i, with the spin parallel to the core spins.