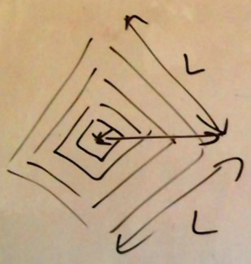
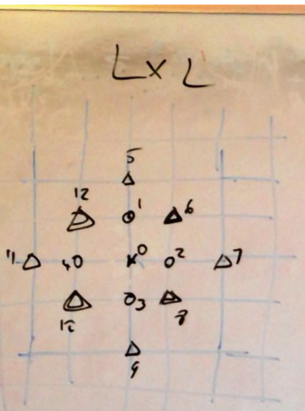
_metal - organic - Frameworks





$$H = \begin{bmatrix} a_0 & b_1 & & & 0 \\ b_1 & a_1 & b_2 & & \\ & b_2 & a_2 & b_3 & \\ & & b_3 & \ddots & \ddots \\ 0 & & & \ddots & \ddots \end{bmatrix}$$

$$H = \sum_{\alpha=0} a_\alpha c^+_\alpha c_\alpha + b_{\alpha+1}\left(c^+_\alpha c_{\alpha+1} + h.c\right)$$

$|\tilde{0}\rangle = c^+_0 |\emptyset\rangle$

$|x\rangle = H|\tilde{0}\rangle$

$|\tilde{1}\rangle = \frac{1}{2}\left[|1\rangle + |2\rangle + |3\rangle + |4\rangle\right] = \frac{1}{2}\left[c^+_1 + c^+_2 + c^+_3 + c^+_4\right]|\emptyset\rangle$

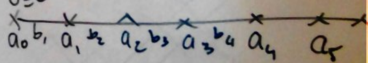
$|\tilde{2}\rangle = H|\tilde{1}\rangle - \langle\tilde{0}|H|\tilde{1}\rangle|\tilde{0}\rangle = \frac{1}{\sqrt{20}}\left[c^+_5 + c^+_7 + c^+_9 + c^+_{11} + 2c^+_6 + 2c^+_8 + 2c^+_{10} + 2c^+_{12}\right]|\emptyset\rangle$

$|\tilde{1}_{B_1}\rangle = \frac{1}{2}\left[|1\rangle - |3\rangle\right]$

$|\tilde{1}_{B_2}\rangle = \frac{1}{2}\left[|2\rangle - |4\rangle\right]$

$|1d\rangle = \frac{1}{2}\left[|1\rangle + |3\rangle - |2\rangle - |4\rangle\right]$

$\tilde{0} \equiv 0$



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Batista Bran
Andrei Fost
Titus Eva Yuval
Taylor

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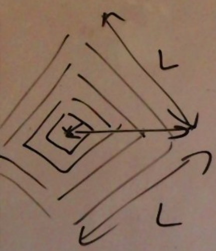

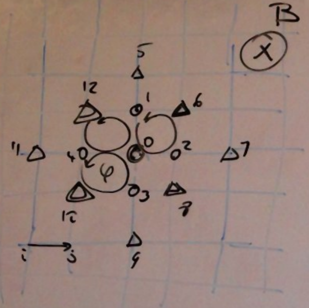

$$H = \begin{bmatrix} a_0 & b_1 & & & 0 \\ b_1 & a_1 & b_2 & & \\ & b_2 & a_2 & b_3 & \\ & & b_3 & \ddots & \\ 0 & & & & \ddots \end{bmatrix}$$

LANL ✓ to .
NSF ✓ Huse
DiDier ✓ Bolech
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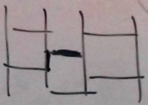
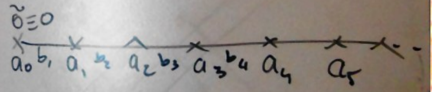
[illegible] Fisher
Israel ✓ Essler ✓
Tsveliko Sahrao
Batista Branislav
Andrei Foster
Titus Eva Yuval
Taylor

$$H = \sum_{\alpha=0} a_\alpha c_\alpha^\dagger c_\alpha + b_{\alpha+1}\left(c_\alpha^\dagger c_{\alpha+1} + h.c\right)$$

$$H_0 = -t \sum_{\langle ij \rangle \sigma}\left(c_{i\sigma}^\dagger c_{j\sigma} + h.c\right) - n_0 \sum_{i\sigma} \frac{c_{i\sigma}^\dagger c_{i\sigma}}{r_i}$$





with B-field) $\int \bar{B} \cdot d\bar{s} \rightarrow \oint \bar{A} \cdot d\bar{l}$

$B = \bar{\nabla} \times \bar{A}$

Peierls substitution

$$H \rightarrow -\sum_{\langle ij \rangle} t\left(e^{i\varphi_{ij}} c_{i\sigma}^\dagger c_{j\sigma} + h.c\right) - n_0 \sum_{ij} \frac{c_{i\sigma}^\dagger c_{i\sigma}}{r}$$

$$\varphi_{ij} = \int_i^j \vec{A} \cdot d\vec{l}$$

A: Landau gauge / Symmetric G.

$B(-y, 0, 0)$ / $\frac{B}{2}(y, +x, 0)$