Fermion Bag Approach to Lattice Hamiltonian Field Theories

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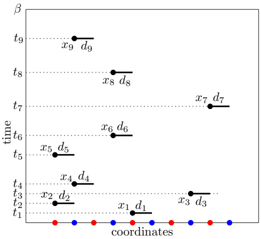
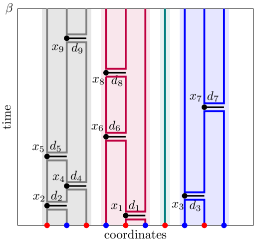
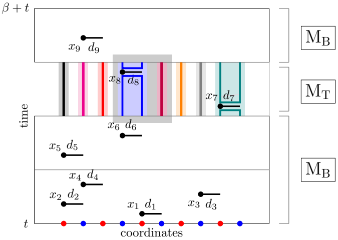
You can learn what these diagrams mean.







You can learn why we like these Hamiltonians.

$$H = \sum_{x,d} -\omega_{\langle x,d\rangle} e^{2\alpha_{\langle x,d\rangle} \sum_{a=1}^{N_f} \left(c_x^{a\dagger} c_{x+\hat{d}}^a + c_{x+\hat{d}}^{a}{}^\dagger c_x^a \right)}$$

You can get technical details.

$$
\begin{aligned}
G'_B &= \left(\mathbb{1} + M_B M + M_B M \left({M_T}^{-1} M'_T - \mathbb{1}\right)\right)^{-1} \\
&= \mathbb{1} - G_B - [G_B]_{N\times s} \left([\mathbb{1} - \mathcal{G}_T + G_B - 2\left(\mathbb{1} - \mathcal{G}_T\right) G_B]_{s\times s}\right)^{-1} \\
&\qquad \times [(\mathbb{1} - 2\mathcal{G}_T)]_{s\times s} [\mathbb{1} - G_B]_{s\times N}
\end{aligned}
$$

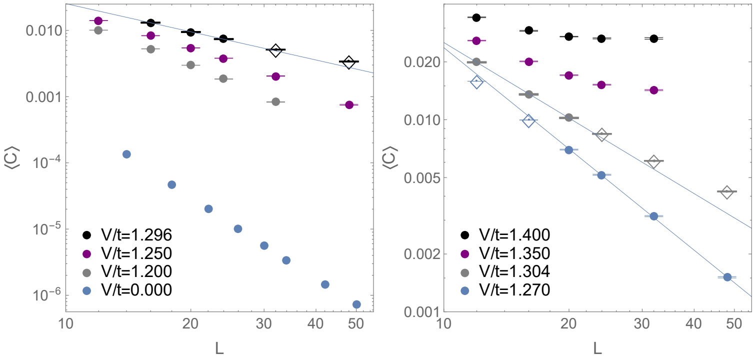
with

$$
G_B = \left(\mathbb{1} + M_B M_T\right)^{-1} M_B M_T \tag{1}
$$

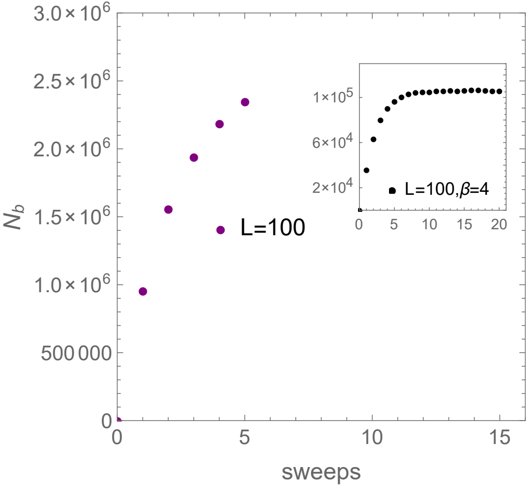
and

$$
\mathcal{G}_T = \left(\mathbb{1} + {M_T}^{-1} {M_T}'\right)^{-1} . \tag{2}
$$

You can see the application to the *t*-*V* model.



You can kind of see an equilibrated $L = 100, \beta = 100$ configuration.



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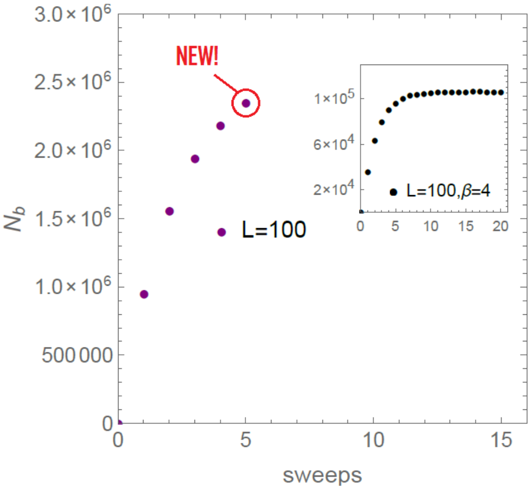

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