UCF

Add

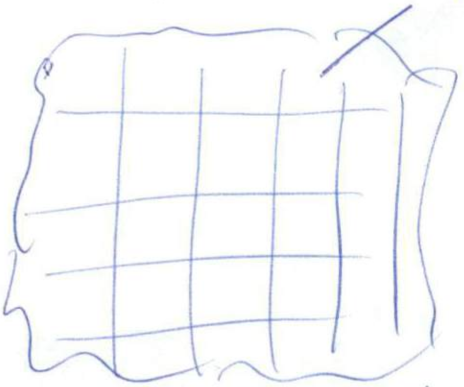
What can we learn from higher moments of G?

Def. the variance

$$\langle \delta G^2 \rangle \equiv \langle G^2 \rangle - \langle G \rangle^2$$

Naive expectation

each piece yield a random G_0 (disorder dependent)



$L \gg l_e$ - Number of pieces $N = \left(L/l_e\right)^d \gg 1$

L_φ - large, T is small $\Big\}$ $L < L_\varphi, L_T$

If we apply the statistical estimate:

WRONG $\quad \dfrac{\sqrt{\langle \delta G^2 \rangle}}{\langle G \rangle} \sim \dfrac{1}{\sqrt{N}} = \left(\dfrac{l_e}{L}\right)^{d/2}$ - depend on disorder

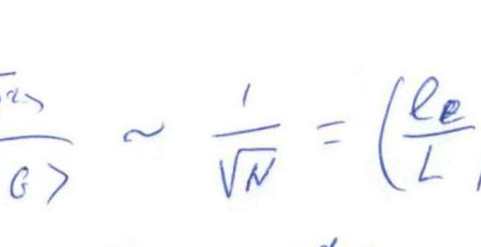
Ohm's law $\langle \bar{G} \rangle = \sigma_0 L^{d-2} \Rightarrow \langle \delta G^2 \rangle \sim L^{-d} \cdot \langle \bar{G} \rangle^2 \sim$

$\sim L^{-d} \cdot L^{2d-4} \sim L^{d-4} \xrightarrow[L \to \infty]{} 0$ for all $d = 1, 2, 3$

In reality $\quad \langle \delta G^2 \rangle \sim \left(\dfrac{e^2}{h}\right)^2$ - are universal and finite due to interference

Important properties

a) g



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either disorder, or B, or ε_F - ergodicity

b) and these random-like curves are reproduceable.

c) $\langle \delta G^2 \rangle$ depend on ε_F, on T (directly) and on B