

Interplay between classical localization and quantal ZPF

$\delta x \delta k \geq 1$

$\varepsilon = \frac{\hbar^2 k^2}{2m}$

$\delta k = \frac{\delta \varepsilon}{\hbar v_F}$

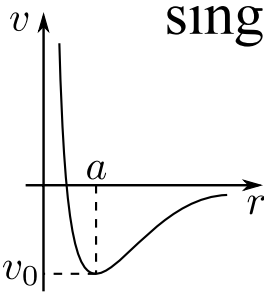
$(v_F/c \approx 0.27)$

structure

Independent motion of

single nucleons

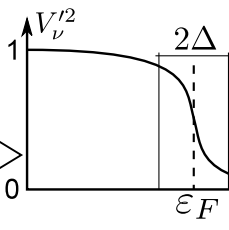
$$a \approx 0.9 \text{ fm}$$



$$v_0 = -100 \text{ MeV}$$

$$\delta \varepsilon = |v_0|; \delta x \approx a$$

pairs of nucleons



$$\Delta \approx 1.5 \text{ MeV}$$

$$\delta \varepsilon \approx 2\Delta; \delta x = \xi$$

$$\xi = \frac{\hbar v_F}{2\Delta} \approx 18 \text{ fm}$$

quantality parameter

$$q = \frac{\hbar^2}{ma^2} \frac{1}{|v_0|} \approx 0.5$$

delocalization

$$q_\xi = \frac{\hbar^2}{2m\xi^2} \frac{1}{2\Delta} \approx 0.06$$

long range correlation

emergent property: generalized rigidity in

3D-space

gauge space

¿how does a short range force lead to

single-nucleon mean free paths

pairing correlations
over distances

larger than nuclear dimension?

$$2R \approx 20/k_F$$

quantal

fluctuations

phase correlations

reactions

single particle transfer, e.g. (p,d)

Cooper pair transfer, e.g. (p,t)

the *absolute cross section* reflects
the full renormalized nucleon
transfer amplitude (energy, single-
particle content, radial dependence
of the wave function (formfactor))

Successive (dominant mechanism)
and simultaneous transfer amplitude
contributions to the *absolute cross section*
carry in a equal efficient manner
information concerning pair correlations