Hamiltonians up to quartic order

— Anisotropic

= Isotropic

I. $\mathcal{H} = \mathcal{H}_{quad} + \mathcal{H}_{quartic}$

<u>Case I</u>:- $\mathcal{H}_{quad} = p_x^2 + p_y^2$. (2 eigenvalues)

II $= p_x^2$ (1 ")

III. $= 0$ (0 ")

ie Arbitrary quadratic $\mathcal{H}$ can be reduced to one of these forms using a linear transformation.

<u>Case I</u>:- As $B \to 0$, ie $l/a \to \infty$ $\left(B \propto \frac{1}{l^2}\right)$.

p_x^2, p_y^2 dominate.

(Assume rescaled coeffs for p^{2n}).

in the Landau gauge.

Suppose $\mathcal{H} = p_x^2 + p_y^2 + \lambda(p_x^4 + p_y^4)$.

$$\mathcal{H} \sim p_x^2 + c B^2 x^2 + \lambda c^2 B^4 x^4$$
$$+ \lambda p_x^4$$

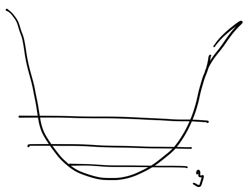
In the LLL / lowest eigenstate of H, ψ is negligible beyond.

$$x \sim l$$

<u>Condn:-</u>

$$\langle c B^2 x^2 \rangle \sim \langle \lambda c^2 B^4 x^4 \rangle$$

$\frac{l}{a} \to \infty$.



$E(p)$.

λ —————————— X.

for $H_{quad} = 0$

$H_{quartic} = H_0^2$

physics — band geometric
- stability of FQHE (gap)

— Hall viscosity
— Conductivity at finite q } depend on H.