PHES of a standard 2DEG in a maanetic field

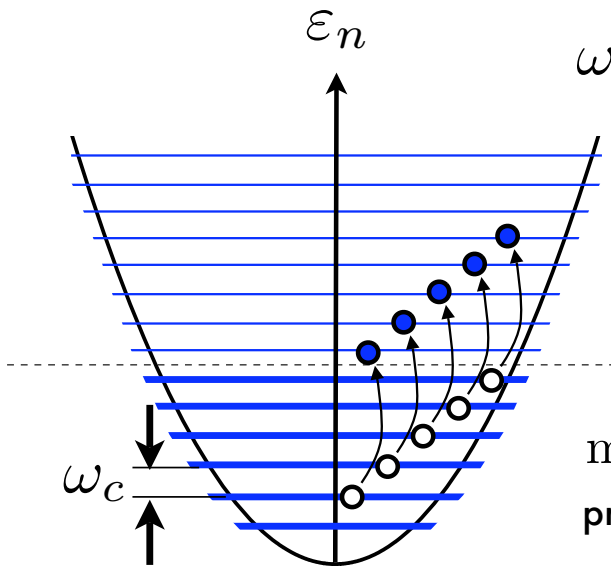
Landau levels (LLs)

$$\varepsilon_n = \hbar \frac{eB}{m_b}\left(n + \frac{1}{2}\right)$$

$$B \neq 0$$

"Density independent" cyclotron frequency

$$\omega_c = \frac{eB}{m_b}$$



$$\omega_{el-hol} \sim m\omega_c$$
$$m \in \mathbb{N}$$

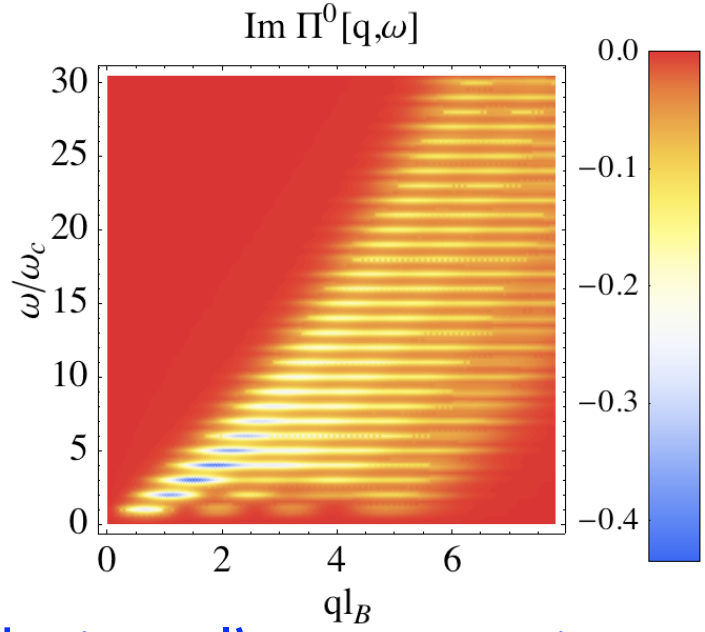
$$\min\{N_F + 1, m\}$$

processes contributing to the m'th line

LL quantization

+

Equidistant LL separation



(horizontal) magneto-excitons

R. Roldán, J.-N. Fuchs & M. O. Goerbig, (Phys. Rev. B, in press)
arXiv: 0809.2667

PHES of graphene in a magnetic field

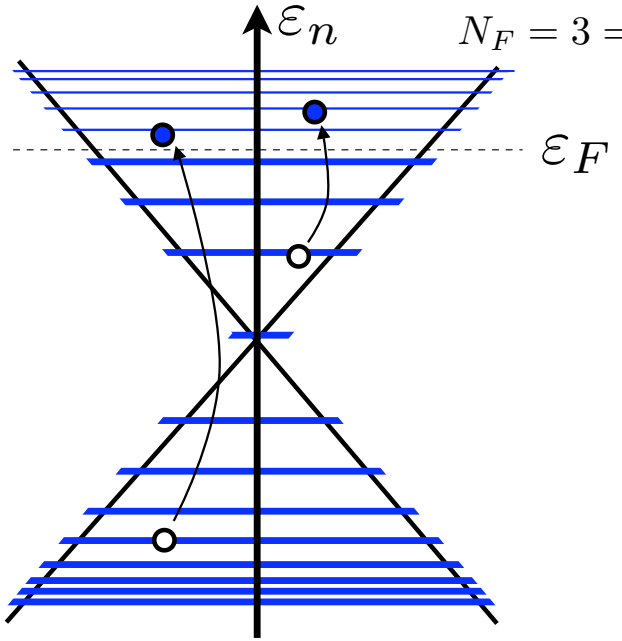
Landau levels (LLs)

$$\varepsilon_{\lambda,n} = \lambda\hbar\frac{v_F}{l_B}\sqrt{2n}$$

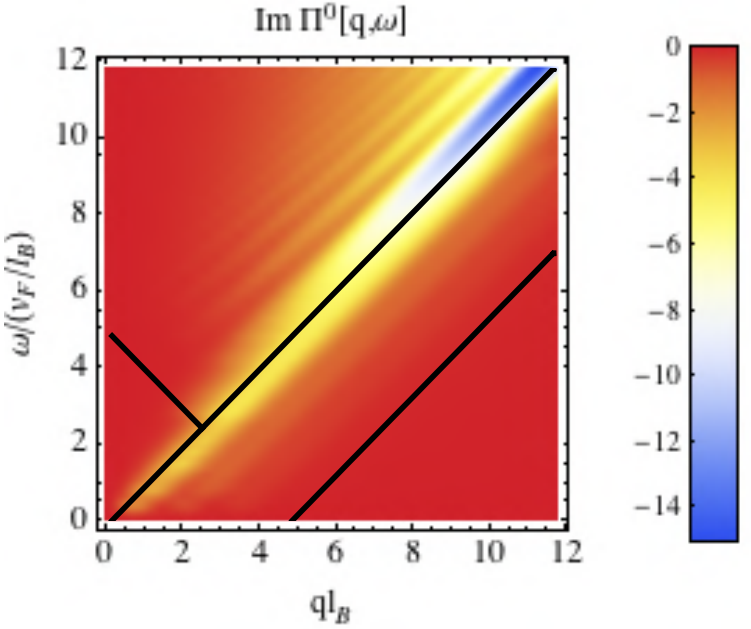
$B \neq 0$

"Density dependent" cyclotron frequency

$$\omega_c(\varepsilon_F) = \frac{eB}{\varepsilon_F / v_F^2}$$



$N_F = 3 \Rightarrow 2k_F = 2\sqrt{7} \simeq 5.3 l_B$



LL quantization

+

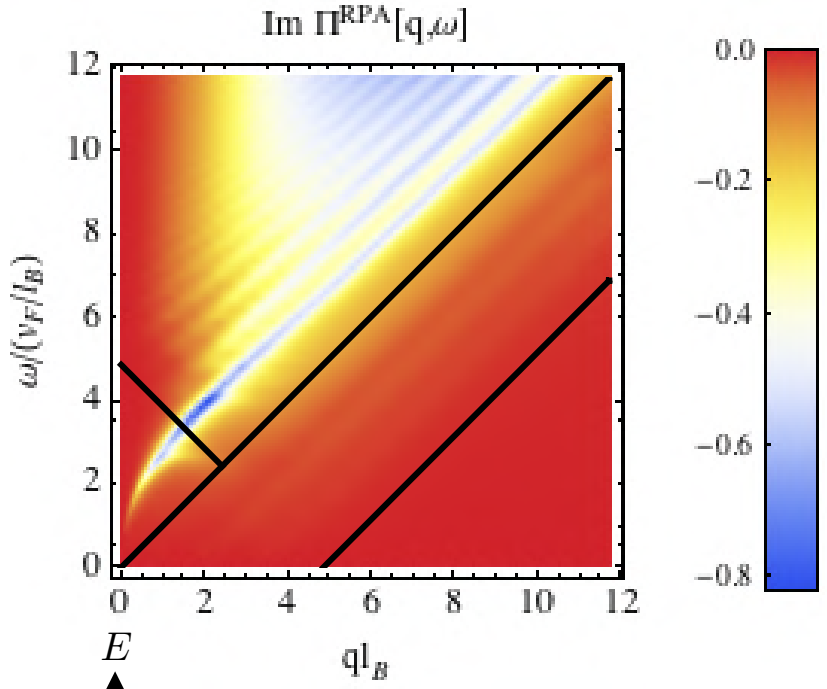
Non-equidistant LL separation

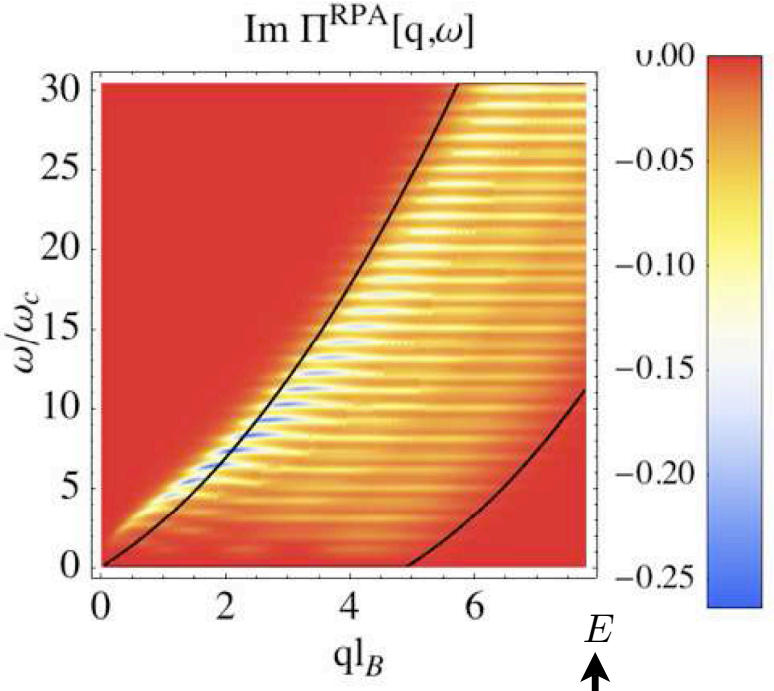
+

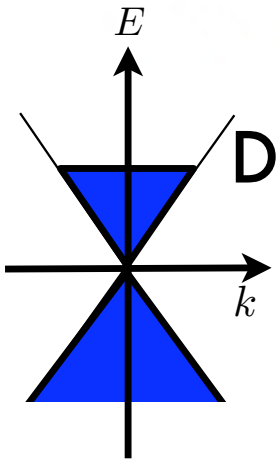
Chirality factor

- blurred horizontal magneto-excitons
- precursor of dispersive modes: (linear) magneto-plasmons

Linear magneto-plasmons rather than horizontal magneto-excitons

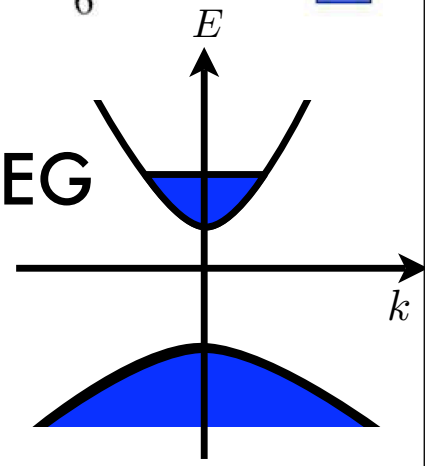






Doped graphene

Standard 2DEG



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