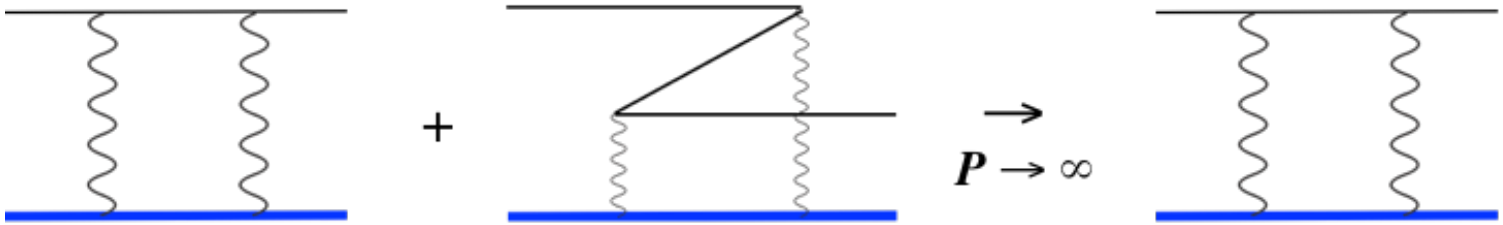
LC2018: LF Vacuum discussion

Jlab May 15

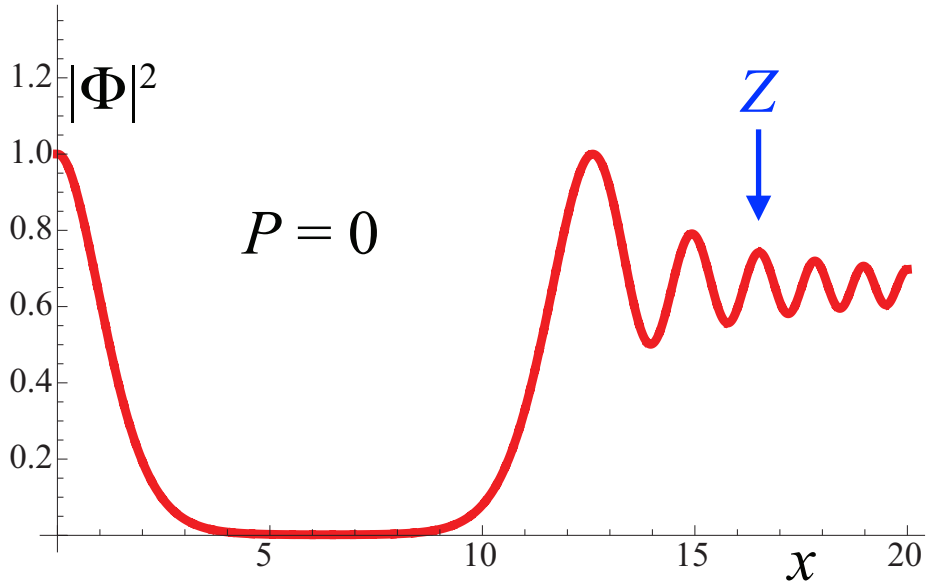
The IMF perspective

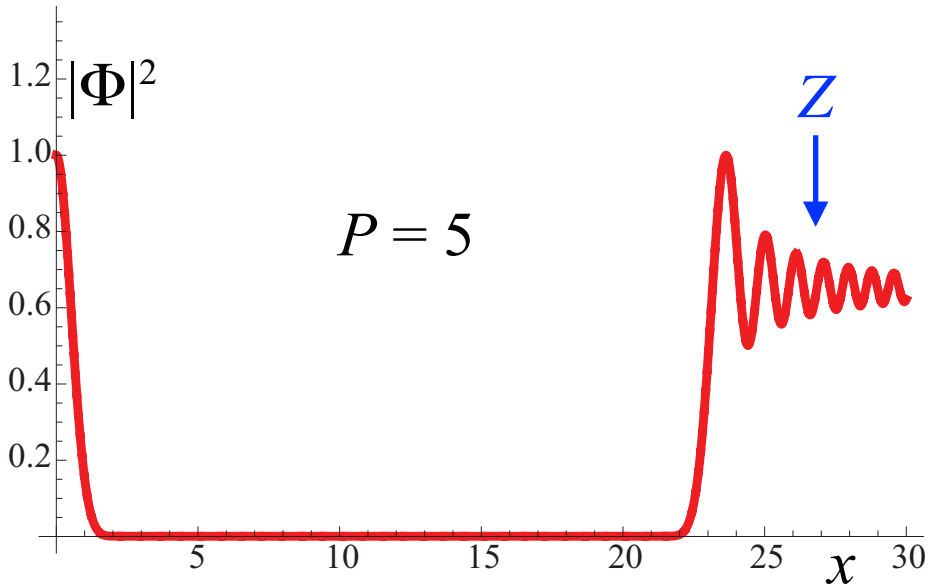
Paul Hoyer
University of Helsinki

Suppression of Z-graphs in the IMF



Seen in $f\bar{f}$ bound states of QED$_2$: $V(x) = \frac{1}{2}|x|$





D.D. Dietrich, PH, M. Järvinen, PRD D87 (2013) 065021 [arXiv: 1212;4747]

Z - contributions move to infinite separation x in the IMF

IMF limit is not smooth, misses sea fermions: $f(x_B) \sim 1/x_B$.

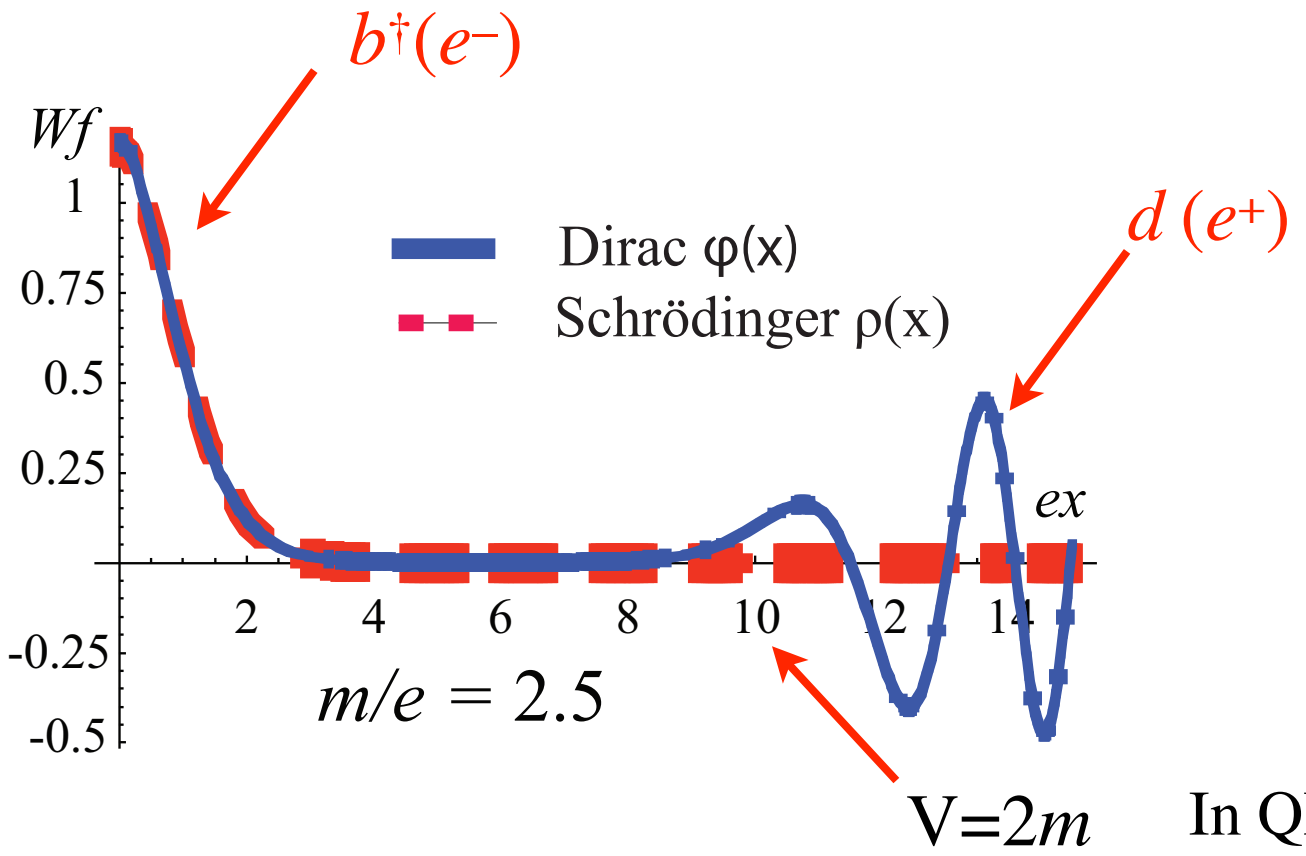
Z-contributions to Dirac states $V(x) = \frac{1}{2}|x|$

$$|M \geq 0\rangle = \int \frac{dp}{2\pi 2E} \int dx \left[b_p^\dagger u^\dagger(p) e^{-ipx} + d_p v^\dagger(p) e^{ipx} \right] \begin{bmatrix} \varphi(x) \\ \chi(x) \end{bmatrix} |\Omega\rangle$$

$\varphi(x)$, $\chi(x)$: Dirac wave fn's

$$|\Omega\rangle = N_0 \exp\left[- b_q^\dagger \left(B^{-1}\right)_{qm} D_{mr} d_r^\dagger \right] |0\rangle$$

PH, arXiv: 1605;01532



The linear potential confines electrons but repulses positrons

In QFT, the Z-contributions describe (quenched) sea-fermions

In the IMF only valence fermions remain!