

Schematic form of  $\phi$  and fermion Green's functions in  $d$  dimensions

$$D(\vec{q}, \omega) = \frac{1/N_f}{q_{\perp}^2 + \frac{|\omega|}{|q_{\perp}|}} \quad , \quad G_f(\vec{q}, \omega) = \frac{1}{q_x + q_{\perp}^2 - i \text{sgn}(\omega) |\omega|^{d/3} / N_f}$$

In the boson case,  $q_{\perp}^2 \sim \omega^{1/z_b}$  with  $z_b = 3/2$ .

In the fermion case,  $q_x \sim q_{\perp}^2 \sim \omega^{1/z_f}$  with  $z_f = 3/d$ .

Note  $z_f < z_b$  for  $d > 2 \Rightarrow$  Fermions have *higher* energy than bosons, and perturbation theory in  $g$  is OK.

Strongly-coupled theory in  $d = 2$ .