where $-,+$ corresponds to g being just below, above g_*, where the scattering length $a=+\infty$ (BEC side) and $a=-\infty$ (BCS side) respectively. It should be kept in mind that the underlying interactions are attractive in both cases since the fixed point occurs at negative g.

In two spatial dimensions the single boson kernel obtained in [20] is

$$
\begin{aligned}
G(|\mathbf{k}|) &= -\frac{4i}{m}\log\left(\frac{1+\frac{mg}{4\pi}\left(\log\left(\frac{2\Lambda}{|\mathbf{k}|}\right)-i\pi/2\right)}{1+\frac{mg}{4\pi}\left(\log\left(\frac{2\Lambda}{|\mathbf{k}|}\right)+i\pi/2\right)}\right) \\
&= -\frac{8}{m}\arctan\left(\frac{mg/8}{1+\frac{mg}{4\pi}\log\left(\frac{2\Lambda}{|\mathbf{k}|}\right)}\right) \\
&= -\frac{8}{m}\arctan\left(\frac{2\pi}{\log(2\Lambda_*/|\mathbf{k}|)}\right)
\end{aligned}
\tag{48}
$$

where Λ_* is defined in eq. (13), and $|\mathbf{k}|=|\mathbf{k}_1-\mathbf{k}_2|$ is the relative momentum. In the unitary limit $g\to\pm\infty$, the theory is at the scale Λ_* and one should consider $|\mathbf{k}_1-\mathbf{k}_2|\approx 2\Lambda_*$. The result is that G becomes a constant in this unitary limit:

$$
G(|\mathbf{k}|)=\mp\frac{4\pi}{m} \qquad\qquad (d=2) \tag{49}
$$

In the attractive case, $|\mathbf{k}-\mathbf{k}'|$ approaches $2\Lambda_*$ from above as $g\to-\infty$, and thus corresponds to the $+$ sign above. The $-$ sign then corresponds to the repulsive case where $2\Lambda_*$ is approached from below.

For two-component fermions, the phase space factors $\mathcal{I}$ in [20] are doubled, and since $G\propto 1/\mathcal{I}$, the kernels have an extra $1/2$ in the fermionic case:

$$
G_{\rm fermi}=\frac{1}{2}G_{\rm bose} \tag{50}
$$

The above unitary limit of the kernels leads to a scale-invariant integral equation for the pseudo-energy, which in turn leads to the scaling forms of the previous section. This will be described in detail for the $d=2$ case in subsequent sections. Note