Scattering in the many-body system

We have, up to now, been discussing mucleon-unclean scattering in fice space. The situation is of course different for the scattering of uncleans in a uncleans or inside a neutron star where there are many nucleons present, which with might in the scattery amplitude.

The difumed to scalling in few space arises from the Pauli principle, i.e., two nucleons can only scally into enter which are not already occupied. At low important, the nucleons occupy all states up to the Fermi energy we can only have \vec{p}_i'

allowed state is conserved state in forbidden

We say the states in the Fermi sea are Pauli-blocked.

Before we continue and discuss, how two-body scaling in modified in the medium, we first consider the scales in the problem.

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In free space: ke= 265 HeV
3.ω/ σ π
770HV ~ 500 PaV ~ 140 MV
1.010. 200 12.1
In the many-body system there is one additional Scale, the
Formi anomenten From elastic & - nucleus scalling, we
know that the central demostris in a nuclem are
80 = fm-3 (tot a nucleon per box
of angle 1 fm)
This corresponds to
$g_0 = \frac{3}{6\pi^2} k_{\rm p}^3$ (g=4 +2 spru, 2 sorp.: degrees of freedom)
-7 Kp 2 1.35 fm ⁻¹ or 265 MeV
This scale lies between the long-range TT exchange and the
short-range part of the interaction. Therefore, the distants of the short-range part of the NN intraction cannot be resoluted and
Vious is a good status point for the many - body problem.
Recall also that he NN Scalley length in the 50 patiel wave
in free space is
$a_{1s_{n}} = -23.73 \text{ fm}.$
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Thus, a natural question to ash is, what happens to this large

Spaing is ~ 1 = 0.75 fm or har go 2 = 1.8 fm, therefore there are many patricle, which sit between two unclass superached by also (composeds to distance one which two nucleus still car each other): 8.5 Also Also In free-space, the Lippenson-Schenige equation can be written disgrammatically as E, I' E, I' Born approximation multiple-scaling.	structure in the premie of other particles. The interparticle
by also (componds to distance over which two nucleus still car each other): 8.3 8.1 Also How does this effect the scattery of neutron 11, and proton p.? In free-space, the Lippman-Scherie equation can be written diagramatically as E, h. E, h. E, h.	Spacing 15 ~ # = 0.75 fm or home go = 1.8 fm, Phirefore
How does this effect the scattery of neutron n, and proton p. ? In free-space, the Lippenson-Scherier equation can be written diagrammatically as E, h = ph' T = p	Twee are many particles, which sit butween two uncleans separated
How does this affect the scattery of neutron 11, and proton p. ? In free-space, the Lippmann-Scherige equation can be written diagramatically as E, h E, h E, h E, h	by also (compounds to distance over which the nucleus still see each other):
How does this affect the scattery of neutron 11, and proton p. ? In free-space, the Lippmann-Scherige equation can be written diagramatically as E, h E, h E, h E, -h	0-1/3
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$\vec{E}, \vec{h}' = \vec{h}'$ $\vec{E}, \vec{h}' = \vec{h}'$ $\vec{E}, \vec{h}' = \vec{h}'$	
E, 1 €, -1 1	•
E, ki €, -ki	E, E' E, E'
E, k €, -k	
E, k €, -k	Town all trens
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	$\vec{E}_{i}\vec{h}$ $\vec{E}_{i}-\vec{h}$
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	- lody system, the multiple scaling states has to be modified to acc	
	. This was addressed by Brutchen	
and cowoke	, who introduced the terminology	"G-matrix for
the solution	of the integral equation in the p	while-pastile
channel with	appropriate fault-blocking.	1 100
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	= \(\frac{1}{2} \)	
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We know that	the waton is momentum - Con	suri so we can
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	\vec{P}_3 $\vec{P}_4 + \vec{P}_3 - \vec{P}_3$	
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	ρ, ω, β, ως	_
Je again thos	1 1 - 2 - 3 - 3 - 12 - 12 - 32	3 = P+ 9/2 - 9/5
	P4-P-9/2+ \$2	

on the center-of-mass momentum ?	
G(4,4', P)	i ja ja
Since the fermi sea breaks Galihan invariance	
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Scatery of the dynamics on the	
1 and 2 Pan, while	
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Morrowe G denute on the energy of the in con-	Calil
pair, W,+Wz, gint as T(E). For particles on the fi	and Sudan
W1+W=24.	
The de man by the state of the Care I	
The phase space for the introduct each can be by writing $\vec{p}_3' = \vec{p}'' + \vec{p}_2'$ and $\vec{p}_4' = \vec{p}_2' - \vec{p}''$ in the c	en sul
27 wild by - b + 25 and by 1/2 - b 1/2 - b	
as Marid in the	
- f-ff-ff ff allowed in she	hd region
	