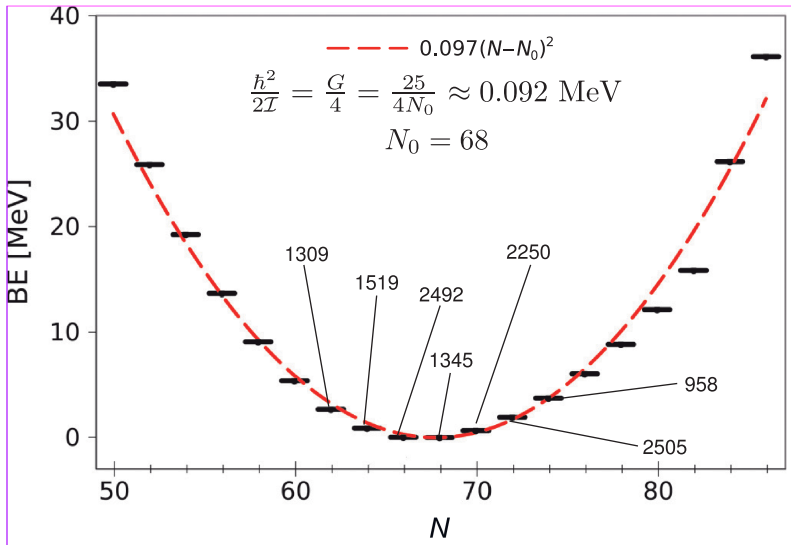


fig1.4.5

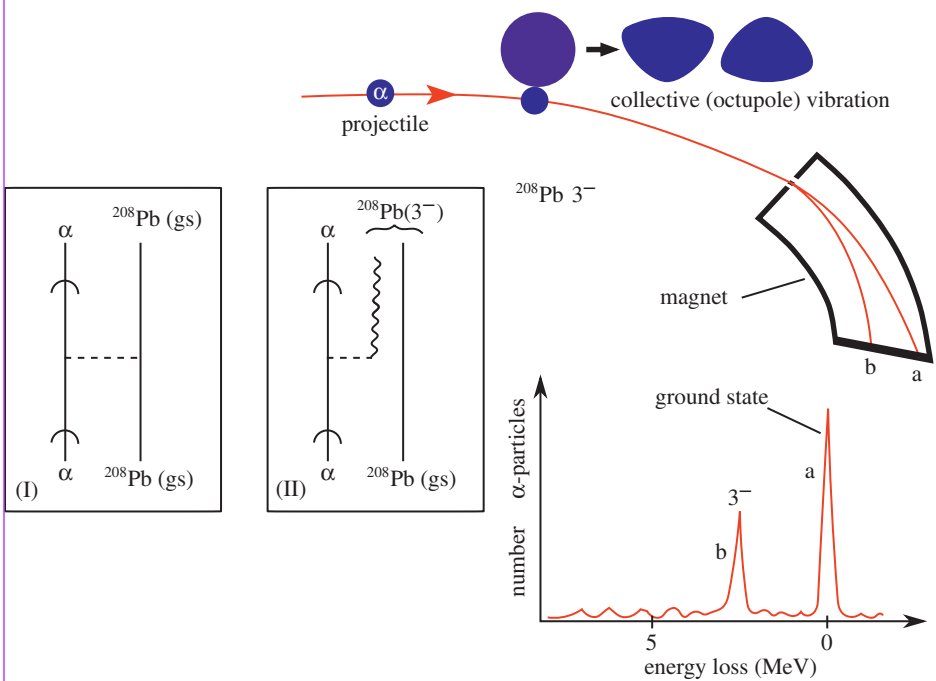


fig2.1.1

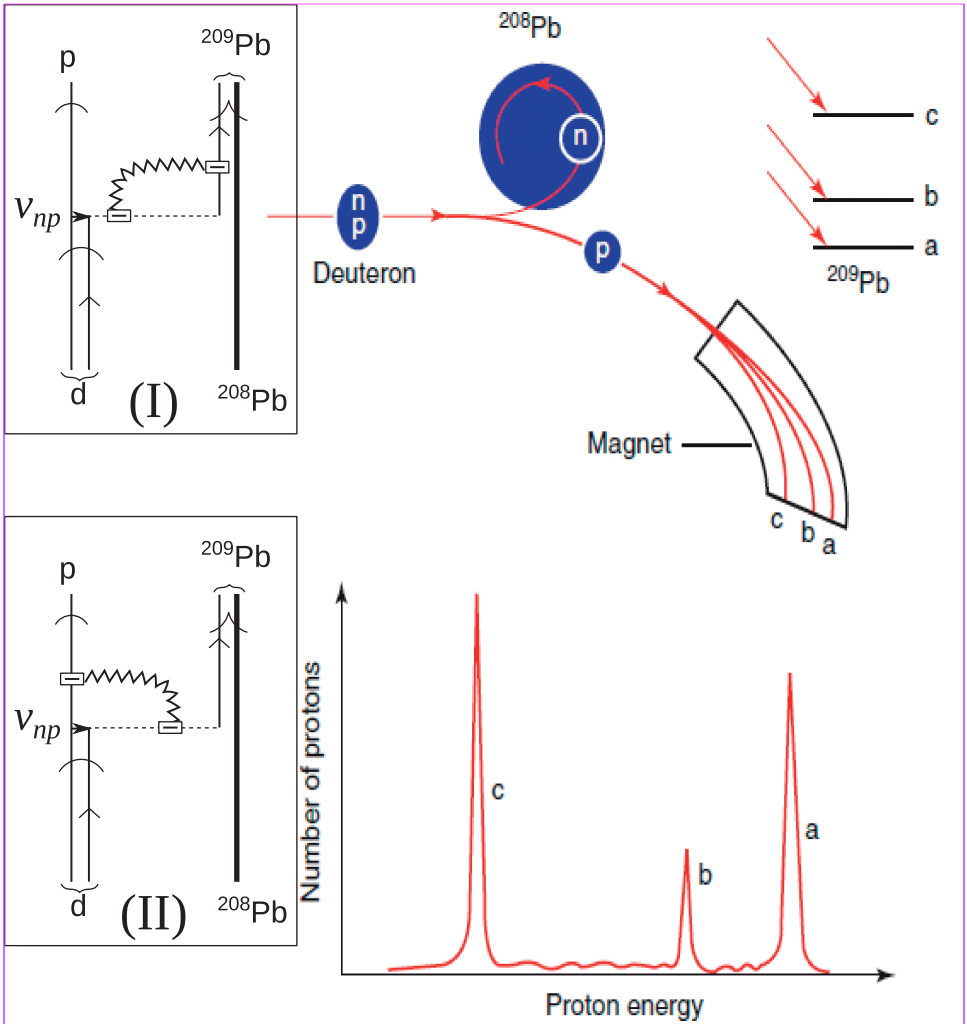

p
209Pb
v_{np}
d
(I)
208Pb
208Pb
n
n
p
Deuteron
p
c
b
a
209Pb
Magnet
c
b
a
p
209Pb
v_{np}
d
(II)
208Pb
Number of protons
c
b
a
Proton energy

fig2.1.2

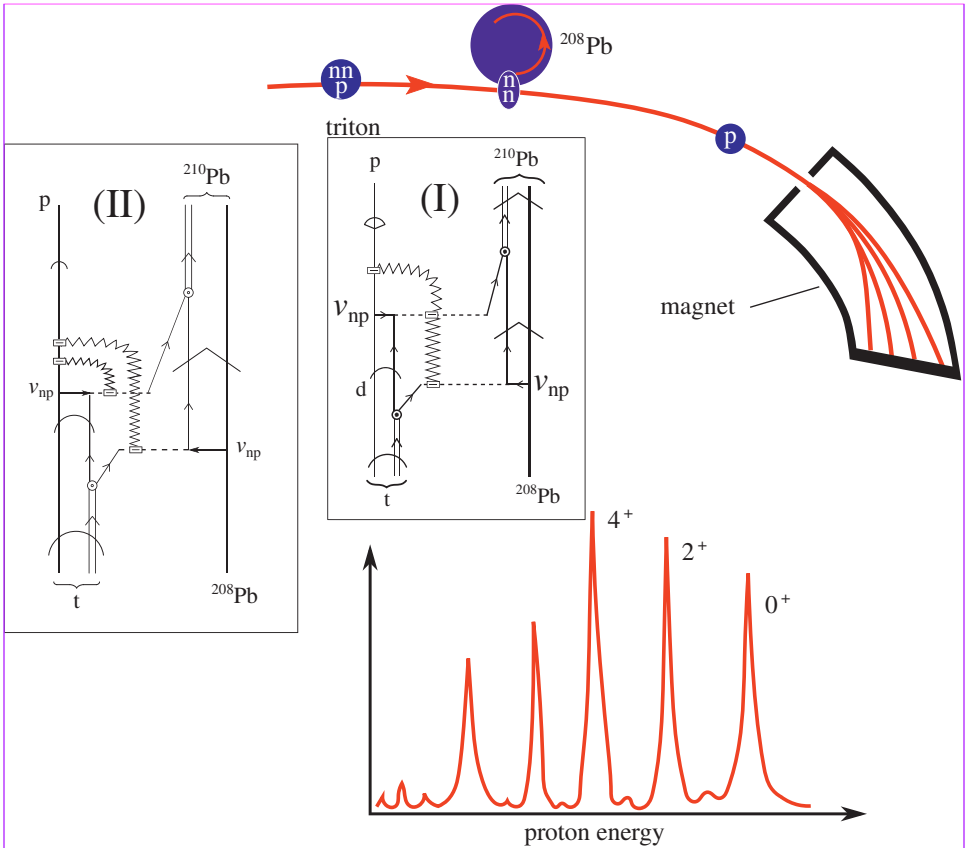
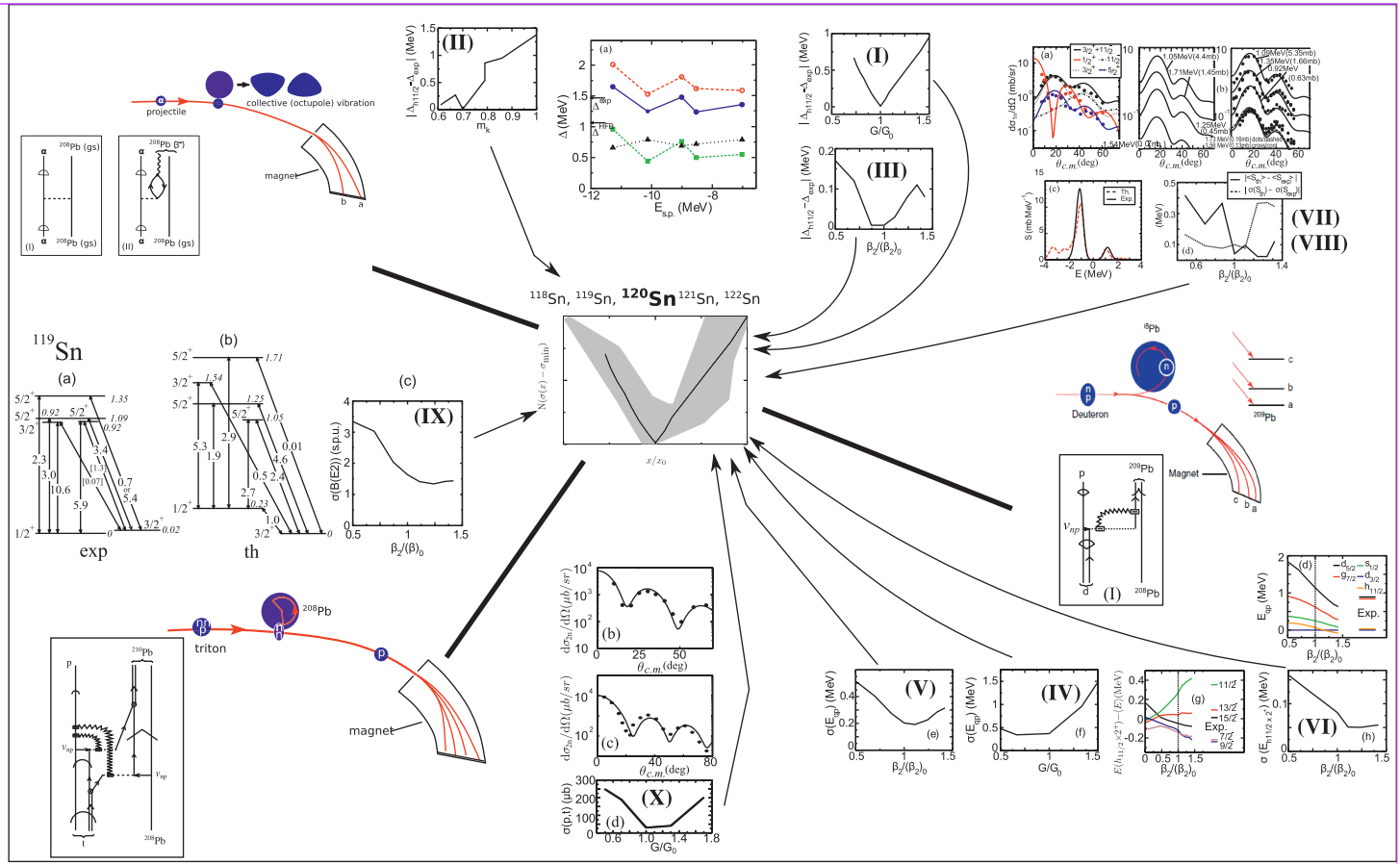

208Pb
nn
p
n
n
triton
p
magnet
(II)
p
210Pb
vnp
vnp
t
208Pb
(I)
p
210Pb
vnp
d
vnp
t
208Pb
4+
2+
0+
proton energy

fig2.1.3

fig2.8.1


projectile
collective (octupole) vibration
magnet
(I)
(II)
(III)
(IV)
(V)
(VI)
(VII)
(VIII)
(IX)
(X)
^{118}Sn, ^{119}Sn, ^{120}Sn ^{121}Sn, ^{122}Sn
^{119}Sn
exp
th
Deuteron
Magnet
triton
^{208}Pb
^{209}Pb
^{210}Pb

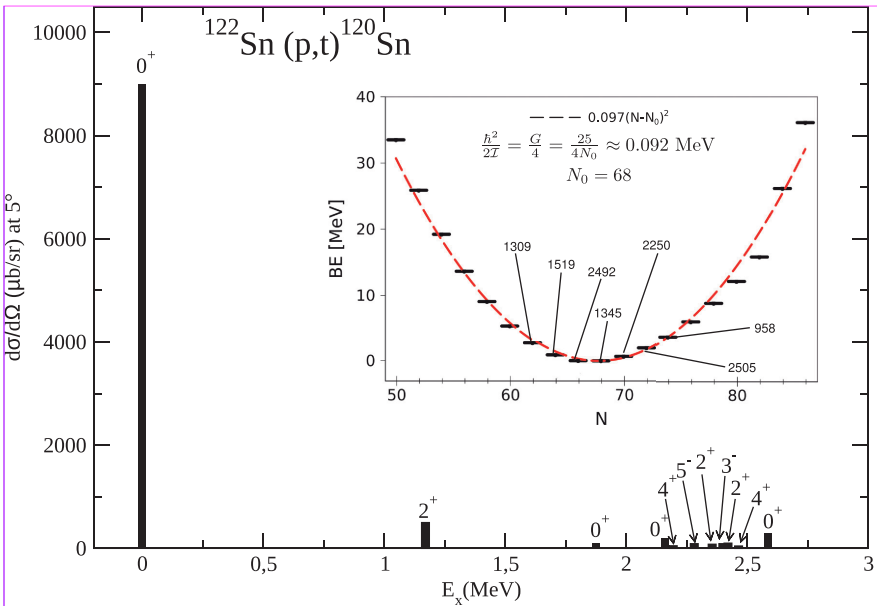


fig3.1.3

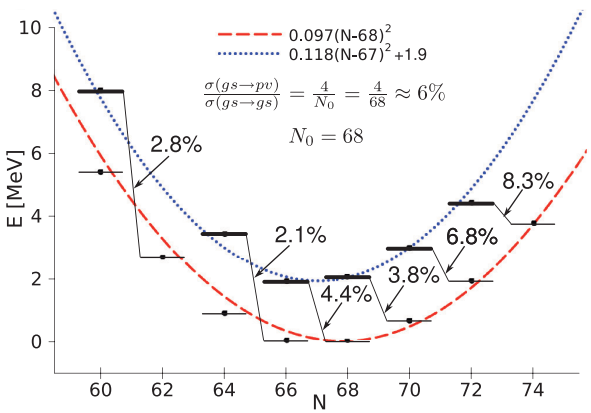


fig3.1.4

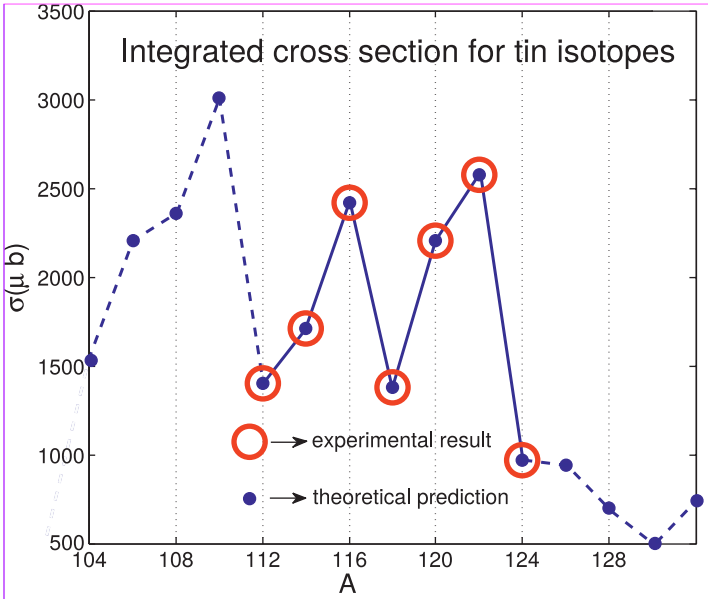

Integrated cross section for tin isotopes
σ(μ b)
A
3500
3000
2500
2000
1500
1000
500
104
108
112
116
120
124
128
experimental result
theoretical prediction

fig3.1.7

$$P^{\dagger} = \sum_{\nu>0} a_{\nu}^{\dagger} a_{\bar{\nu}}^{\dagger}$$

$$x' = \frac{2G\Omega'}{D} = GN(0)$$

$x'>1$

$$\alpha_0 = < P^{\dagger} > = \frac{\Delta}{G} \approx 7$$

$x'>1$

$$\alpha_{dyn} = \frac{<PP^{\dagger}>^{1/2} + <P^{\dagger}P>^{1/2}}{2}$$

$$\approx \frac{1}{2}\left(\frac{E_{corr}(A+2)}{G} + \frac{E_{corr}(A-2)}{G}\right) \approx 10$$

$$\frac{\alpha_0}{\alpha_{dyn}} \approx 0.7$$

$$\frac{\beta_2}{(\beta_2)_{dyn}} \approx 3 - 6$$

fig3.5.7

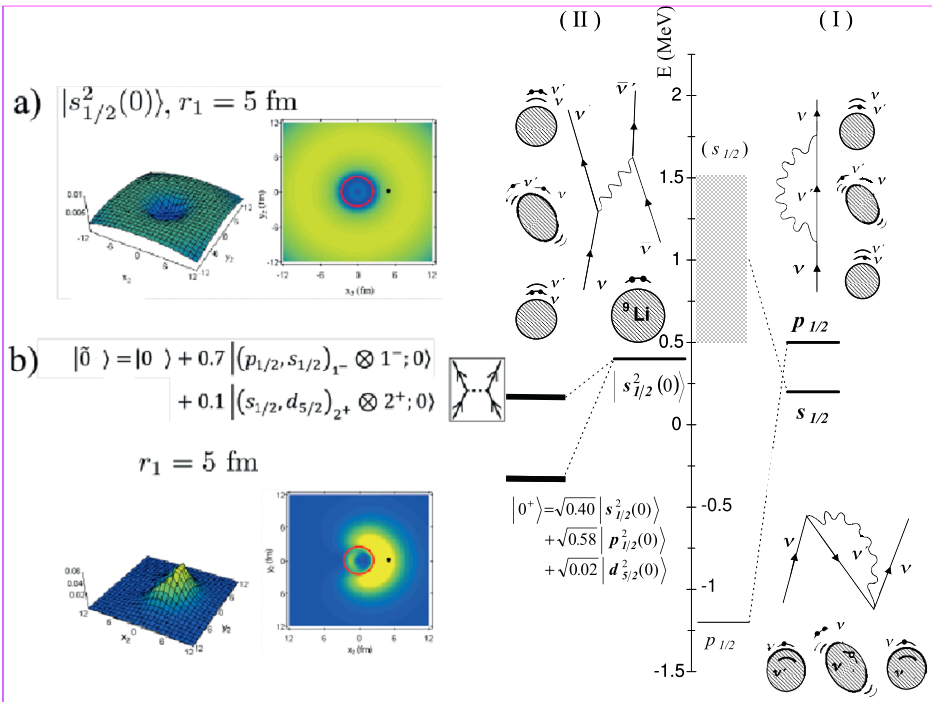


fig3.6.2

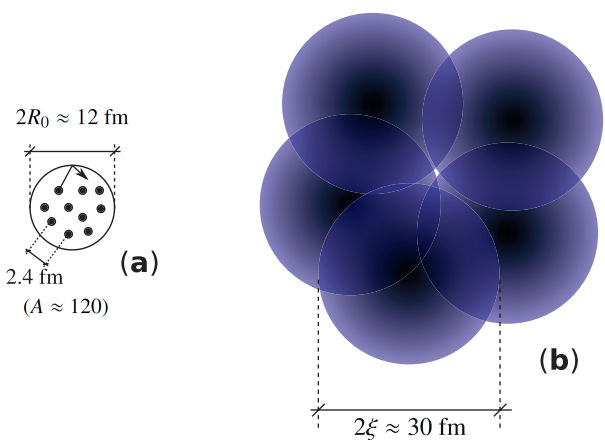


fig4.3.1

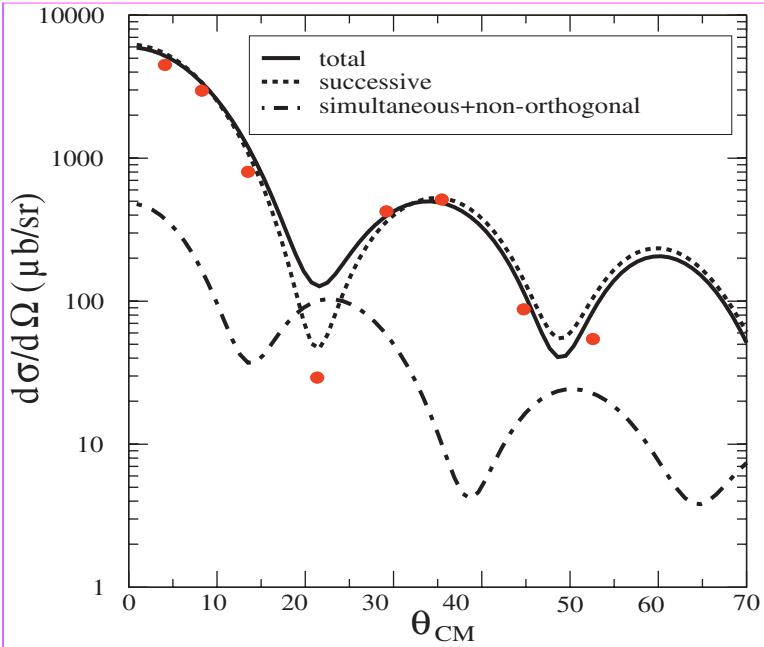

total
successive
simultaneous+non-orthogonal
dσ/dΩ (μb/sr)
θ CM
10000
1000
100
10
1
0
10
20
30
40
50
60
70

fig4.5.3

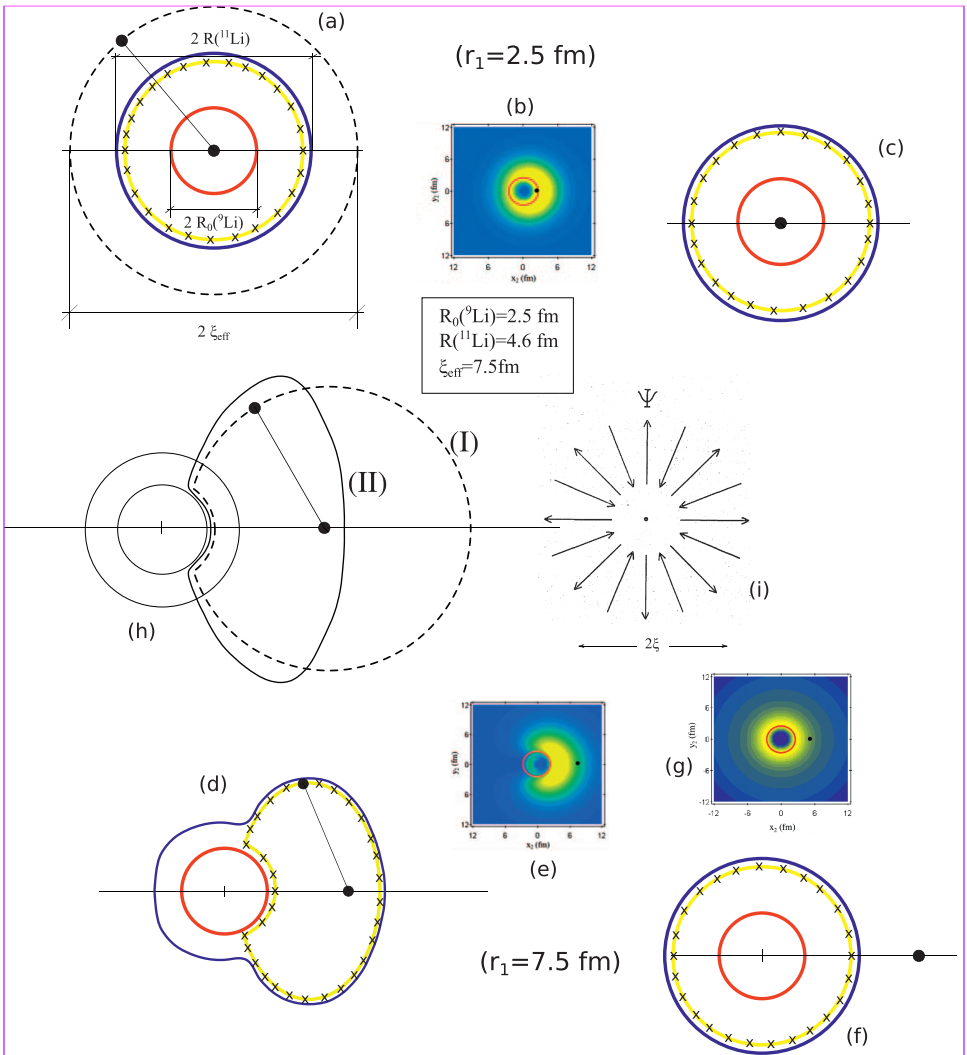

(a)
2 R(11Li)
2 R0(9Li)
2 ξeff
(r1=2.5 fm)
(b)
(c)
R0(9Li)=2.5 fm
R(11Li)=4.6 fm
ξeff=7.5fm
(I)
(II)
(h)
Ψ
(i)
2ξ
(d)
(e)
(g)
(r1=7.5 fm)
(f)

fig4.9.1

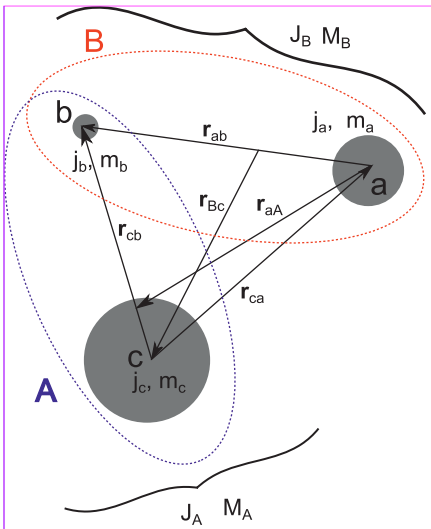
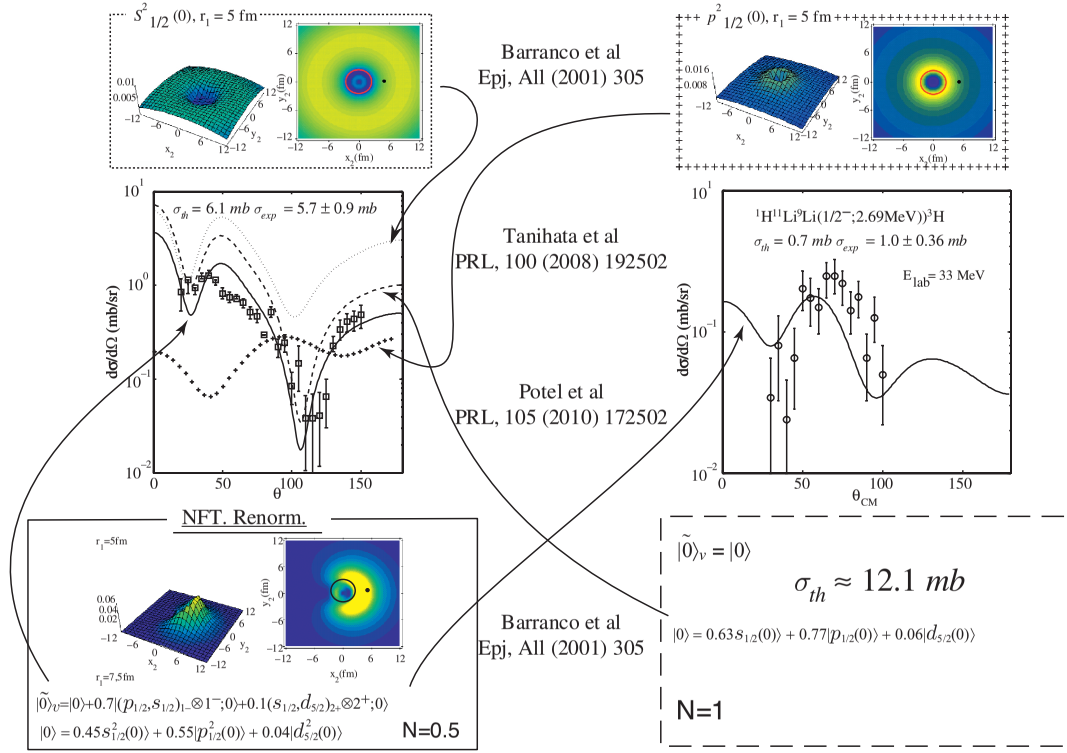

B
J_B M_B
b
j_b, m_b
$\mathbf{r}_{ab}$
j_a, m_a
a
$\mathbf{r}_{Bc}$
$\mathbf{r}_{aA}$
$\mathbf{r}_{cb}$
$\mathbf{r}_{ca}$
c
j_c, m_c
A
J_A M_A

fig5.7.4

fig7.1.2


$S^2_{1/2}(0)$, $r_1 = 5$ fm
$p^2_{1/2}(0)$, $r_1 = 5$ fm
Barranco et al
Epj, All (2001) 305
Tanihata et al
PRL, 100 (2008) 192502
Potel et al
PRL, 105 (2010) 172502
Barranco et al
Epj, All (2001) 305
$\sigma_{th} = 6.1\ mb\ \sigma_{exp} = 5.7 \pm 0.9\ mb$
$d\sigma/d\Omega$ (mb/sr)
θ
$^1H(^{11}Li^9Li(1/2^-;2.69MeV))^3H$
$\sigma_{th} = 0.7\ mb\ \sigma_{exp} = 1.0 \pm 0.36\ mb$
$E_{lab} = 33$ MeV
θ_{CM}
NFT. Renorm.
r_1=5fm
r_1=7.5fm
$|\tilde{0}\rangle_{\nu}=|0\rangle+0.7|(p_{1/2},s_{1/2})_{1^-};0\rangle\otimes 1^-;0\rangle+0.1(s_{1/2},d_{5/2})_{2^+}\otimes 2^+;0\rangle$
$|0\rangle = 0.45 s^2_{1/2}(0)\rangle + 0.55|p^2_{1/2}(0)\rangle + 0.04|d^2_{5/2}(0)\rangle$
N=0.5
$|\tilde{0}\rangle_{\nu} = |0\rangle$
$\sigma_{th} \approx 12.1\ mb$
$|0\rangle = 0.63 s_{1/2}(0)\rangle + 0.77|p_{1/2}(0)\rangle + 0.06|d_{5/2}(0)\rangle$
N=1

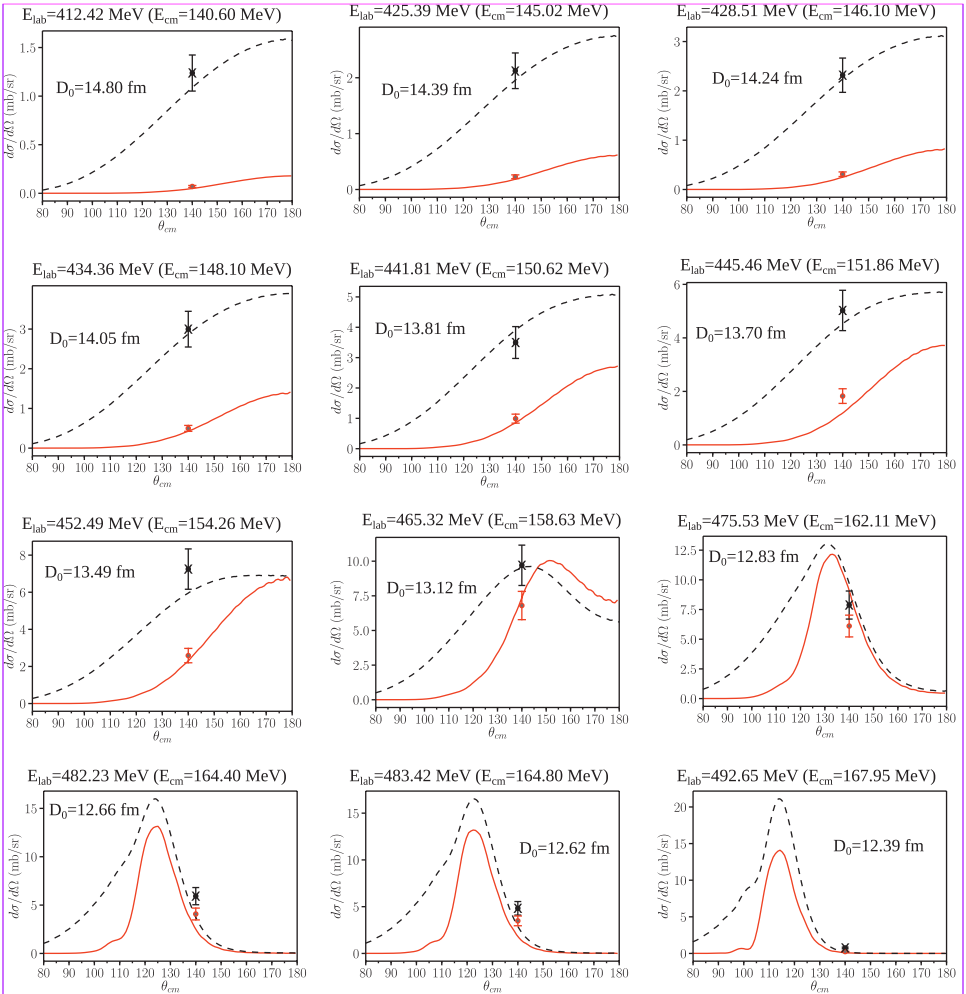

E_lab=412.42 MeV (E_cm=140.60 MeV)
D_0=14.80 fm
E_lab=425.39 MeV (E_cm=145.02 MeV)
D_0=14.39 fm
E_lab=428.51 MeV (E_cm=146.10 MeV)
D_0=14.24 fm
E_lab=434.36 MeV (E_cm=148.10 MeV)
D_0=14.05 fm
E_lab=441.81 MeV (E_cm=150.62 MeV)
D_0=13.81 fm
E_lab=445.46 MeV (E_cm=151.86 MeV)
D_0=13.70 fm
E_lab=452.49 MeV (E_cm=154.26 MeV)
D_0=13.49 fm
E_lab=465.32 MeV (E_cm=158.63 MeV)
D_0=13.12 fm
E_lab=475.53 MeV (E_cm=162.11 MeV)
D_0=12.83 fm
E_lab=482.23 MeV (E_cm=164.40 MeV)
D_0=12.66 fm
E_lab=483.42 MeV (E_cm=164.80 MeV)
D_0=12.62 fm
E_lab=492.65 MeV (E_cm=167.95 MeV)
D_0=12.39 fm
dσ/dΩ (mb/sr)
θ_cm

fig7.3.1

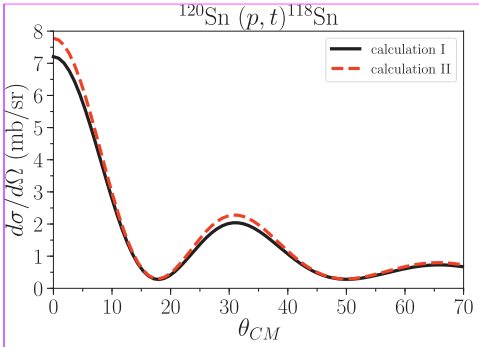


fig7.A.1

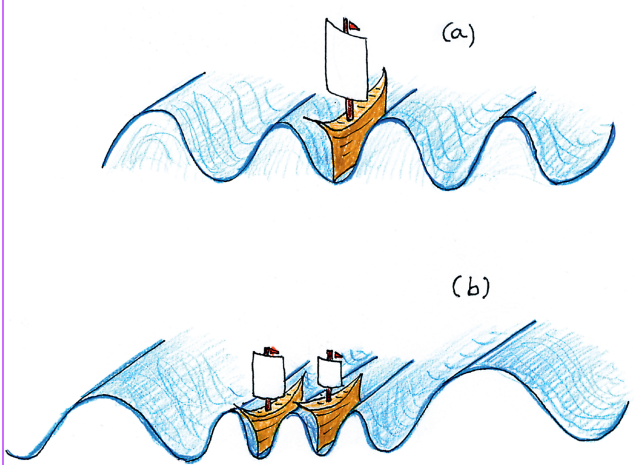


fig7.E.2

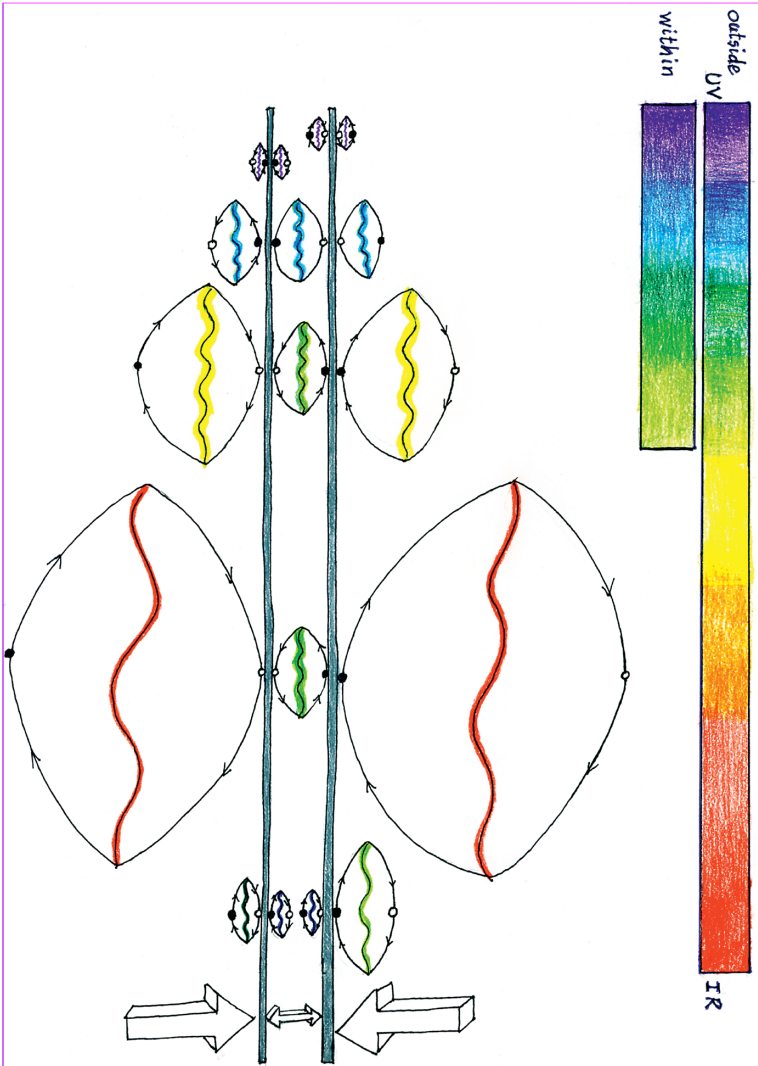


fig7.E.3

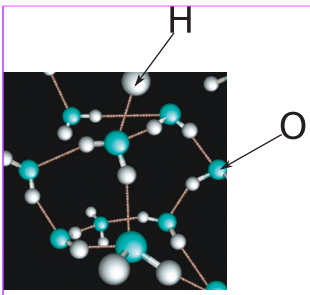


fig7.E.6

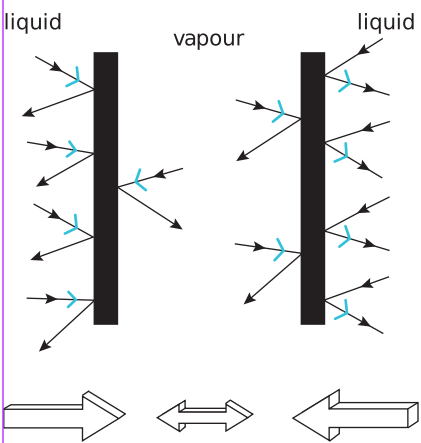


fig7.E.7