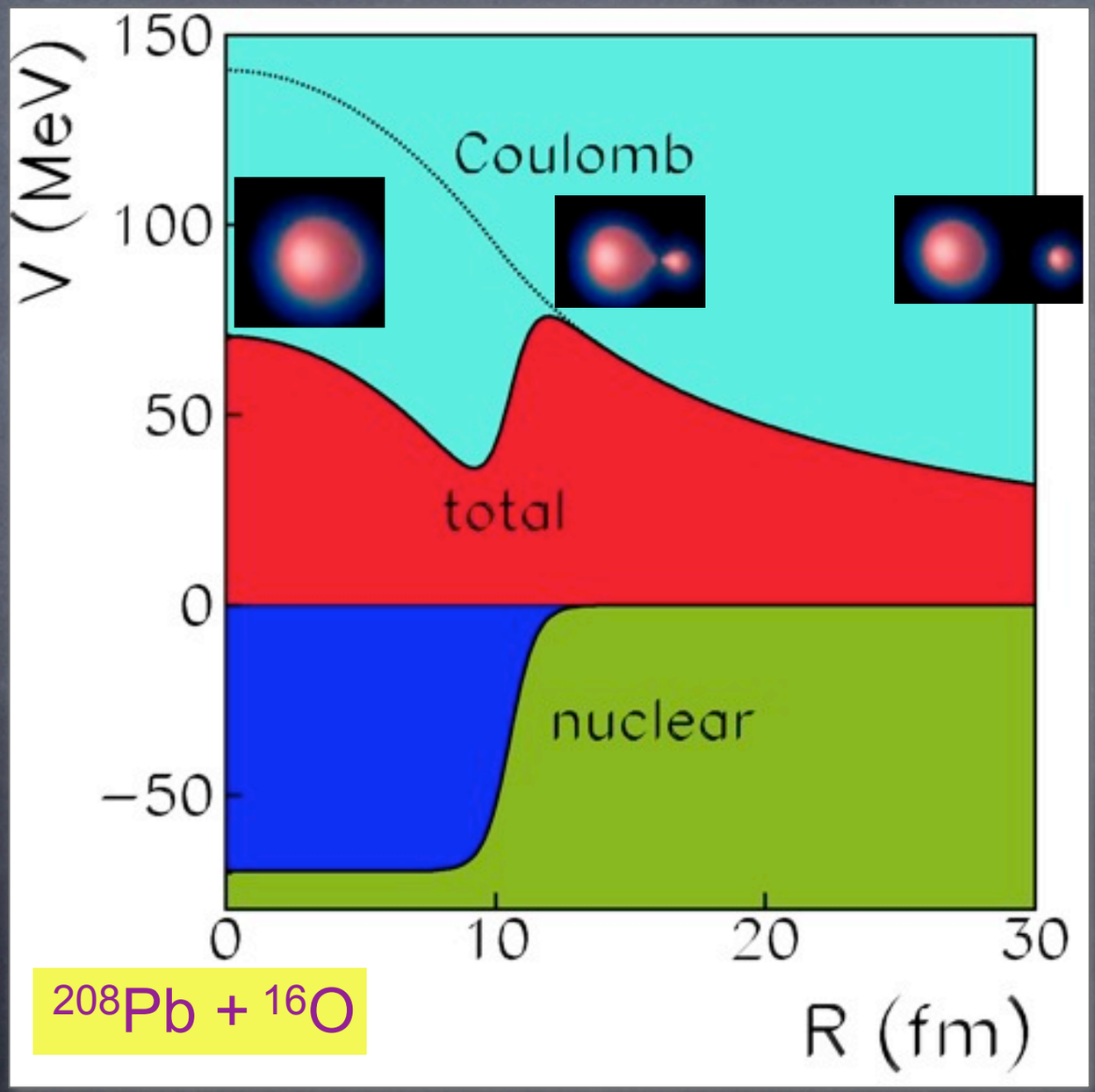
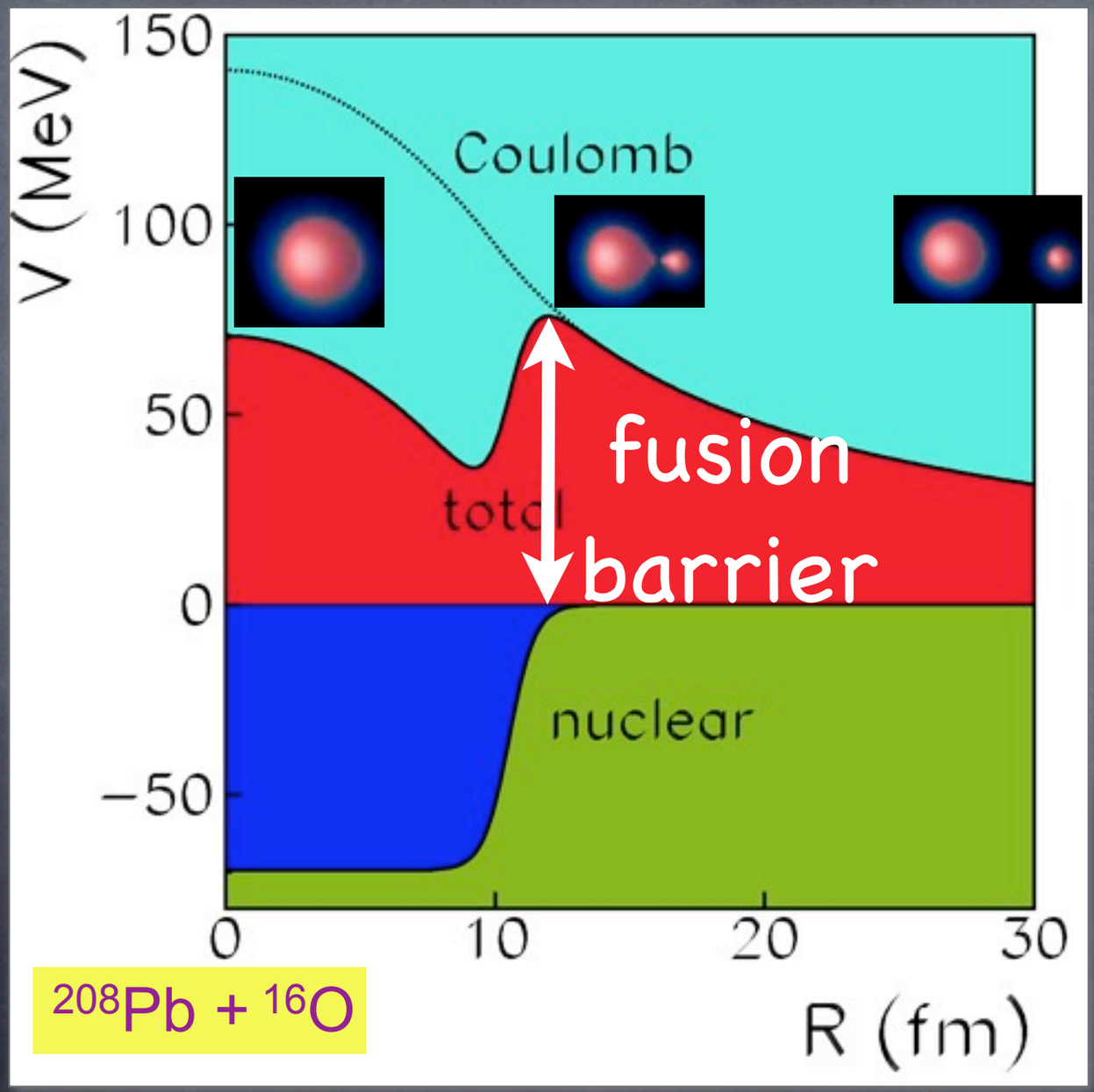
Fusion

- Large amplitude collective motion
- Fusion barrier
- Quantum tunnelling
- Interplay with transfer reactions

Fusion


150
100
50
0
−50
V (MeV)
Coulomb
total
nuclear
0
10
20
30
R (fm)
^{208}Pb + ^{16}O

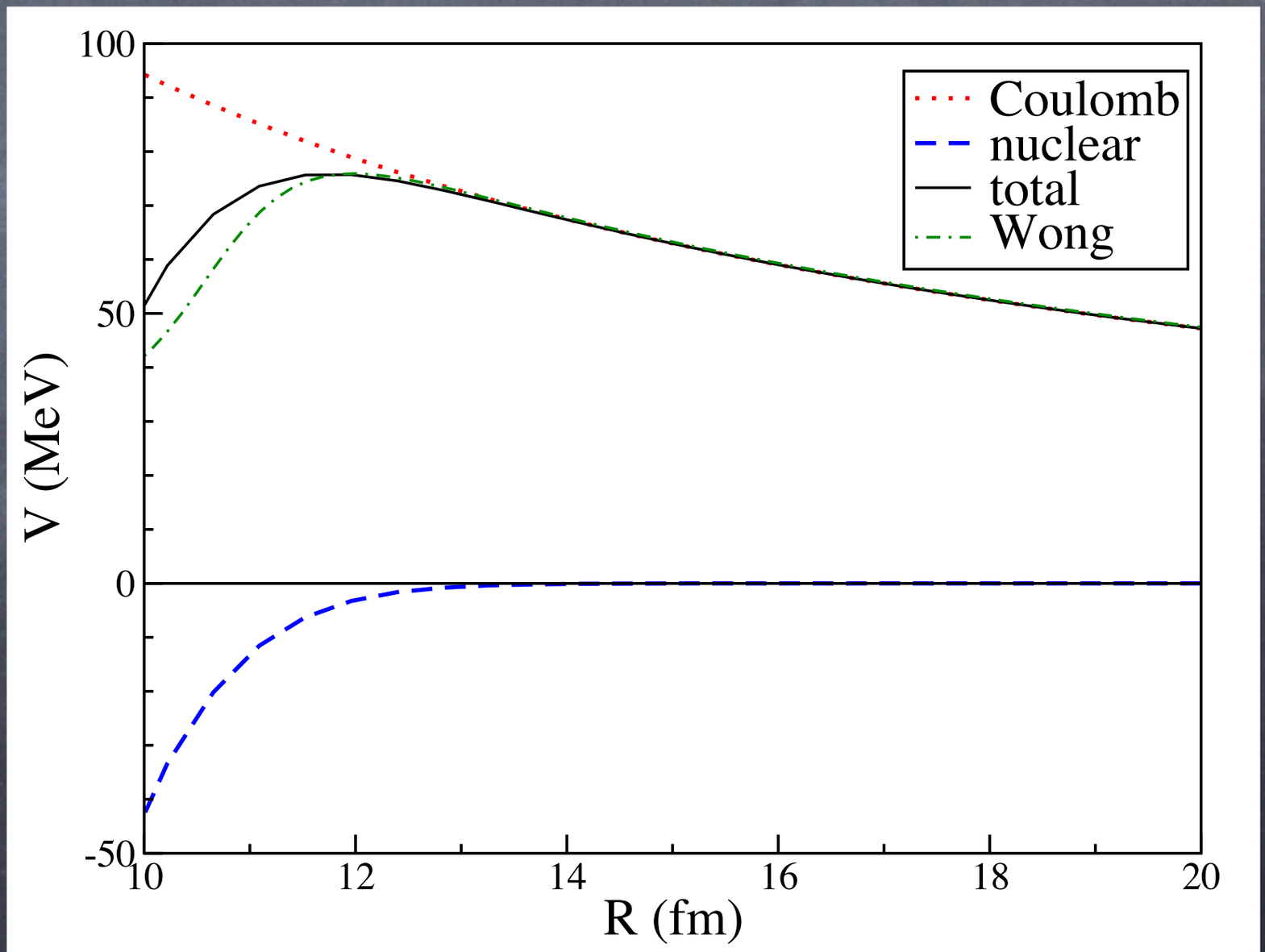
Fusion


150
100
50
0
−50
V (MeV)
Coulomb
total
fusion
barrier
nuclear
0
10
20
30
R (fm)
208Pb + 16O

Fusion

potential from HF ground state densities

$^{16}O+^{208}Pb$

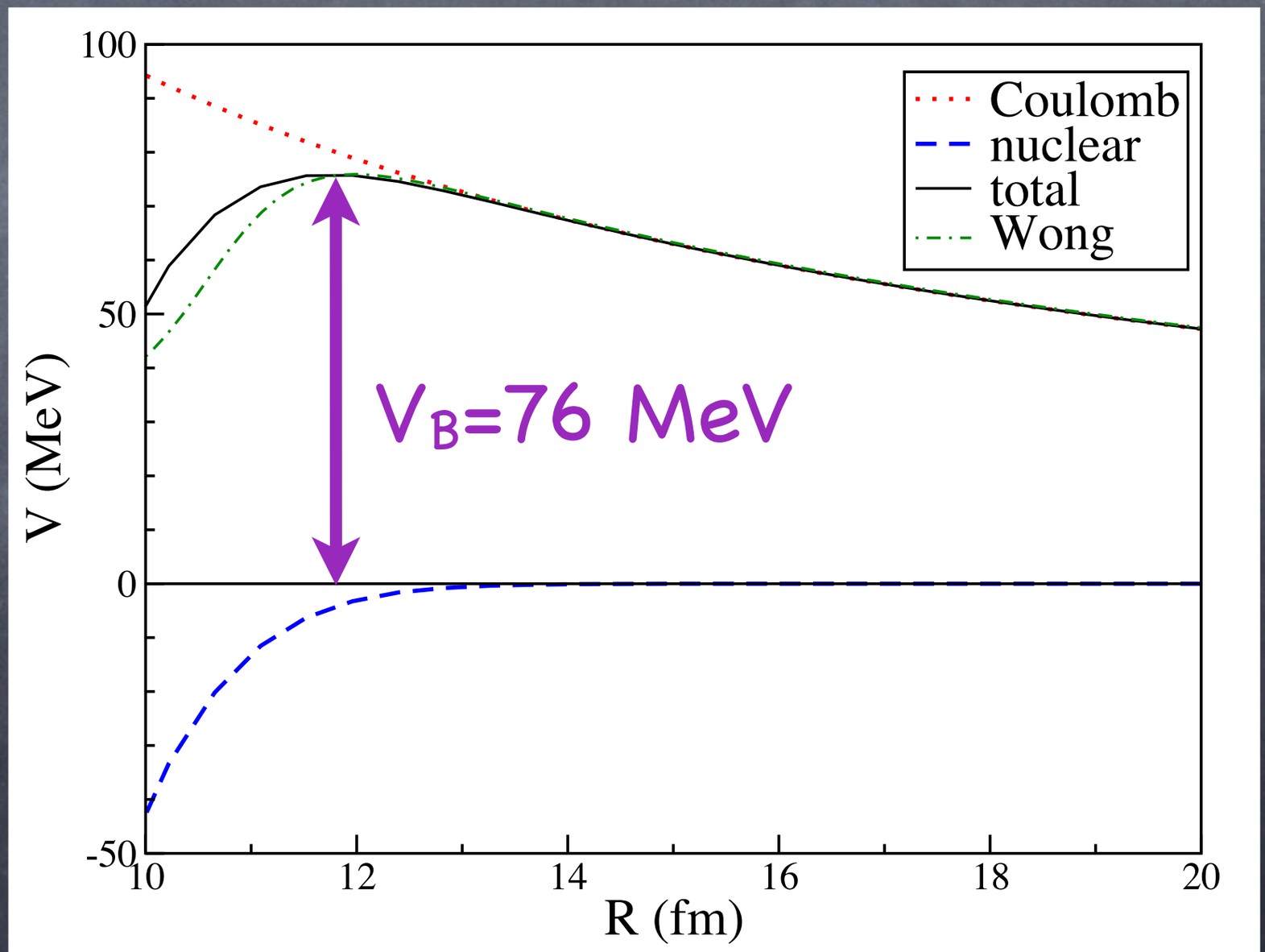


Fusion

potential from HF ground state densities

(exp: V_B=74.5 MeV)

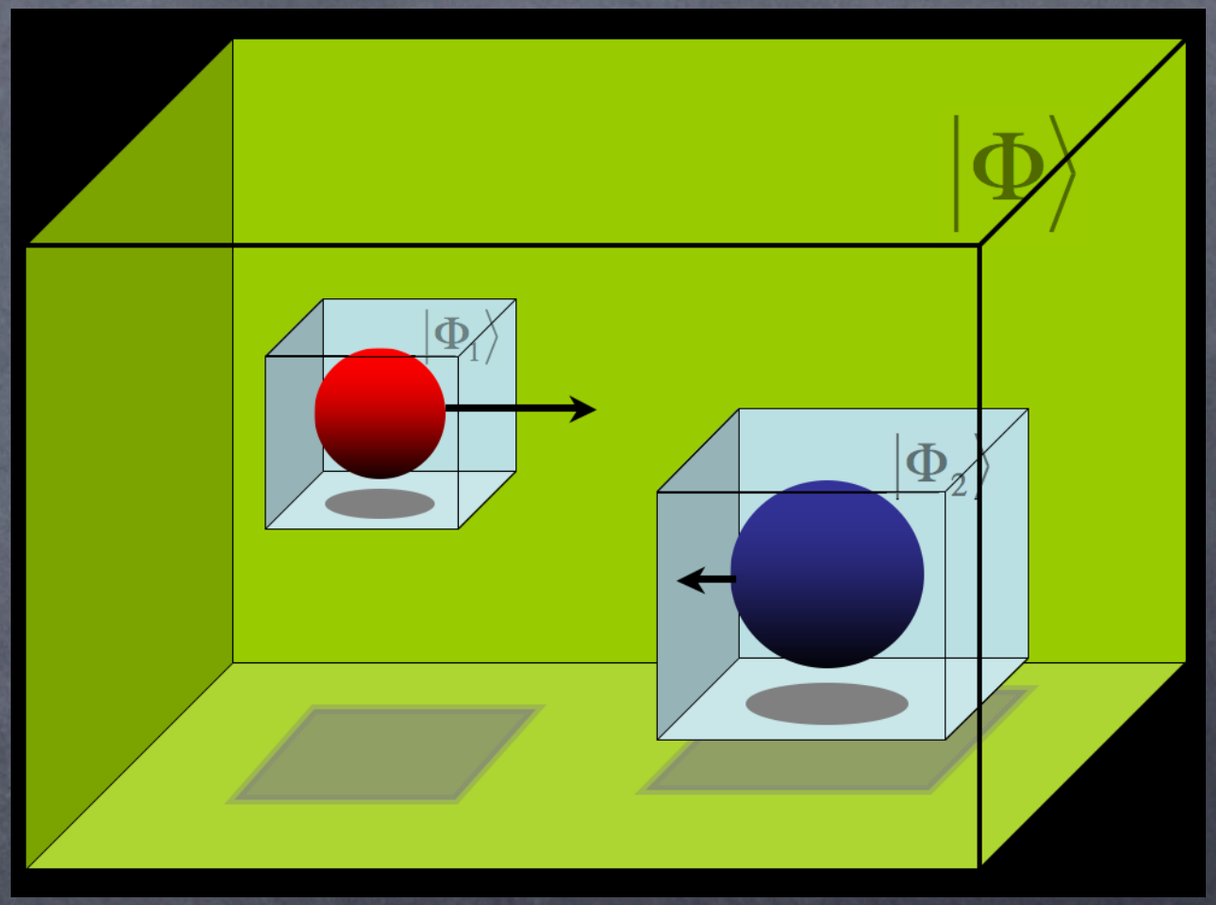
$^{16}O+^{208}Pb$



Fusion with TDHF

Initial velocities $\mathbf{v}_{1,2}$
from Rutherford traj.

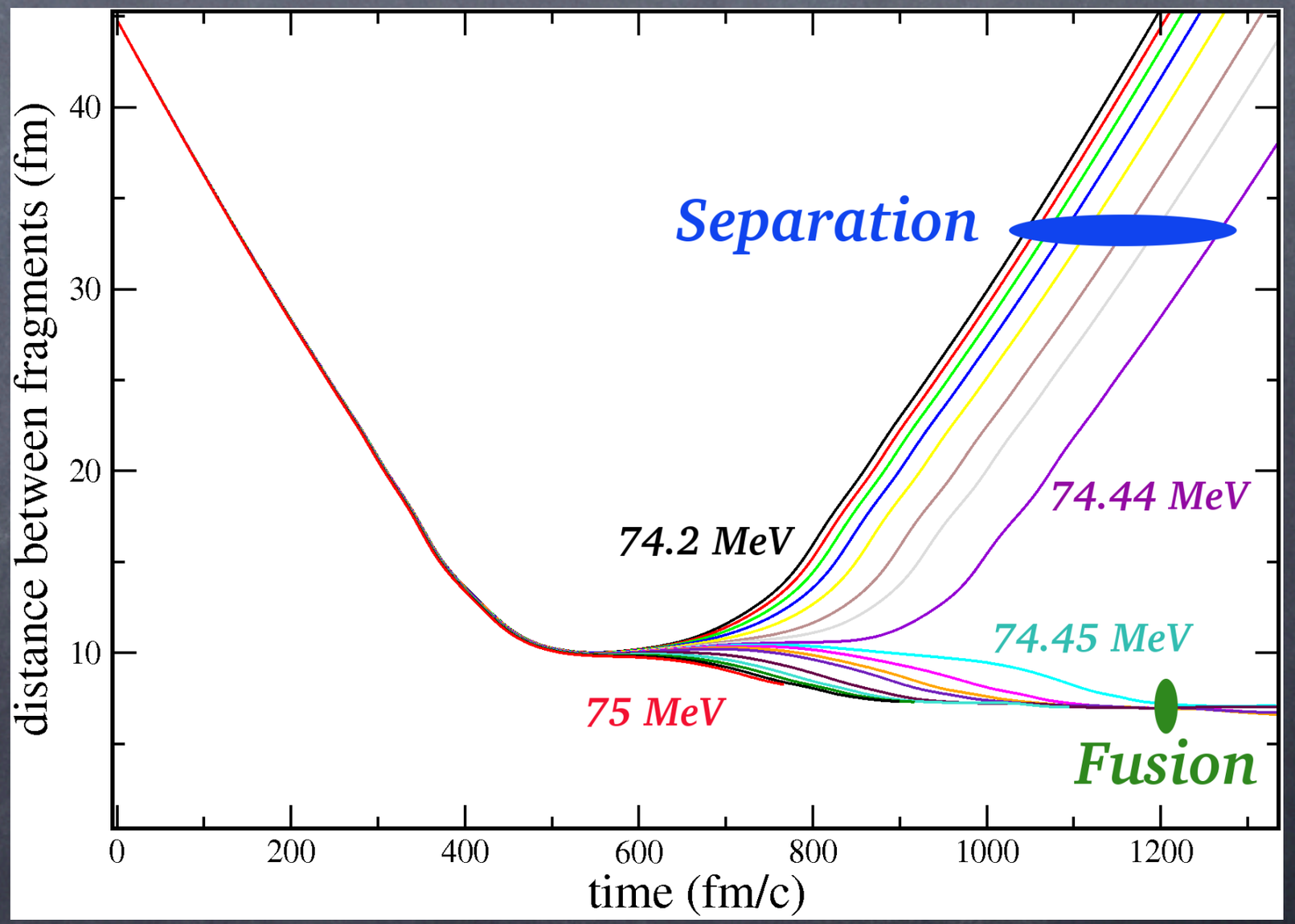
Galielean boost exp(i**kr**)
with $\mathbf{k}_{1,2}=m\mathbf{v}_{1,2}/\hbar$



Fusion with TDHF

TDHF trajectories

$^{16}O+^{208}Pb$



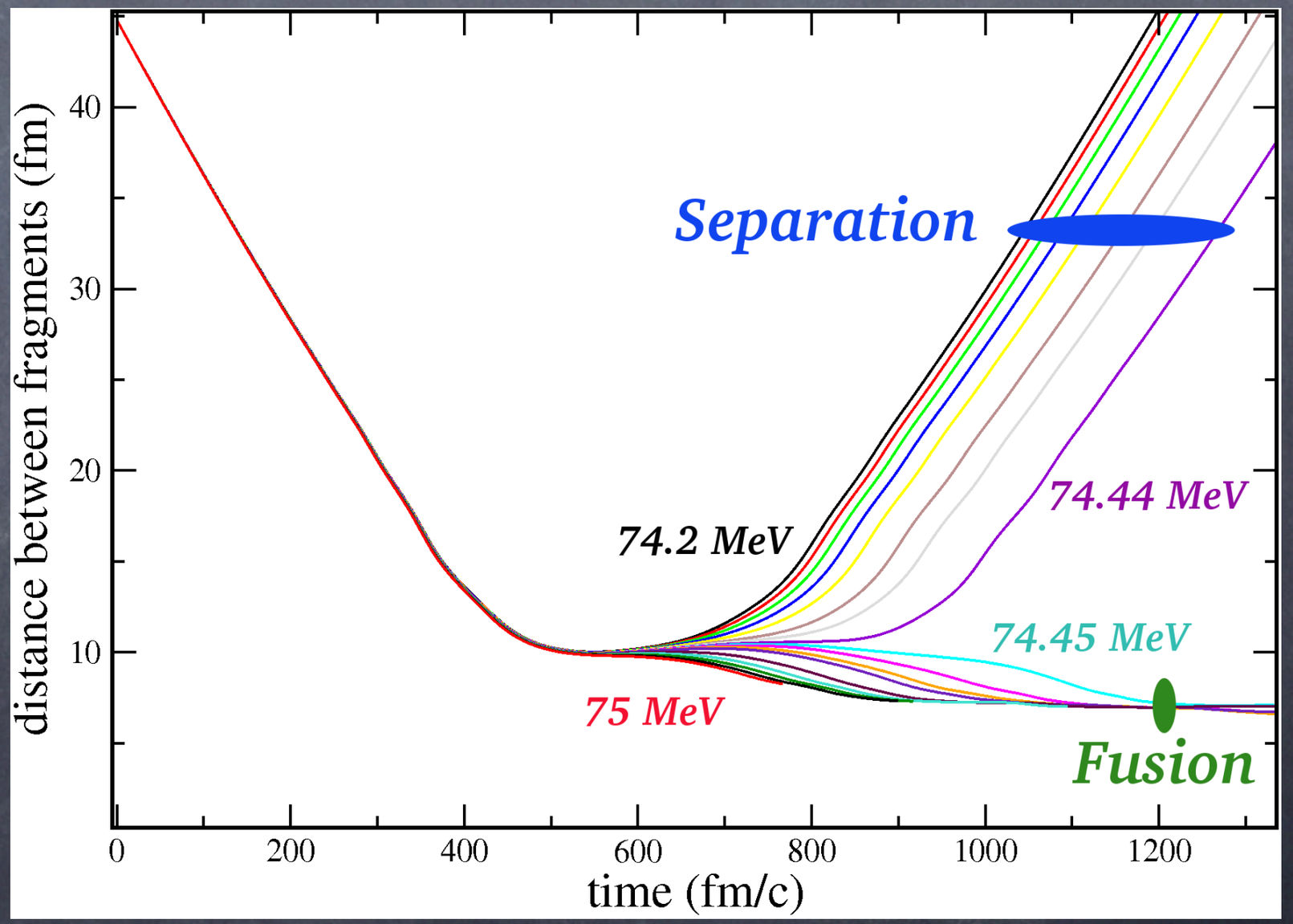
Fusion with TDHF

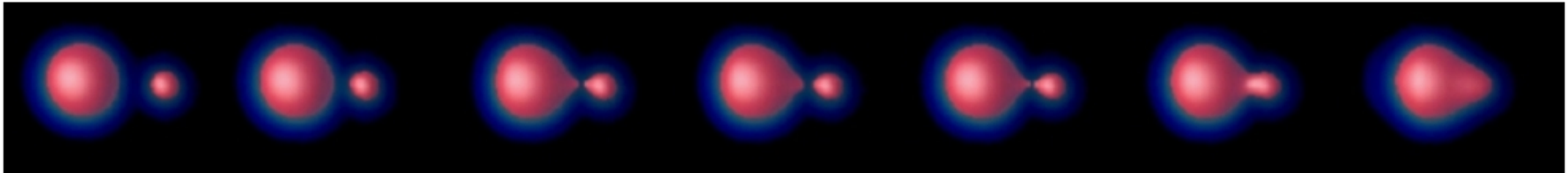
TDHF trajectories

$^{16}O+^{208}Pb$

=> V_B=74.45 MeV

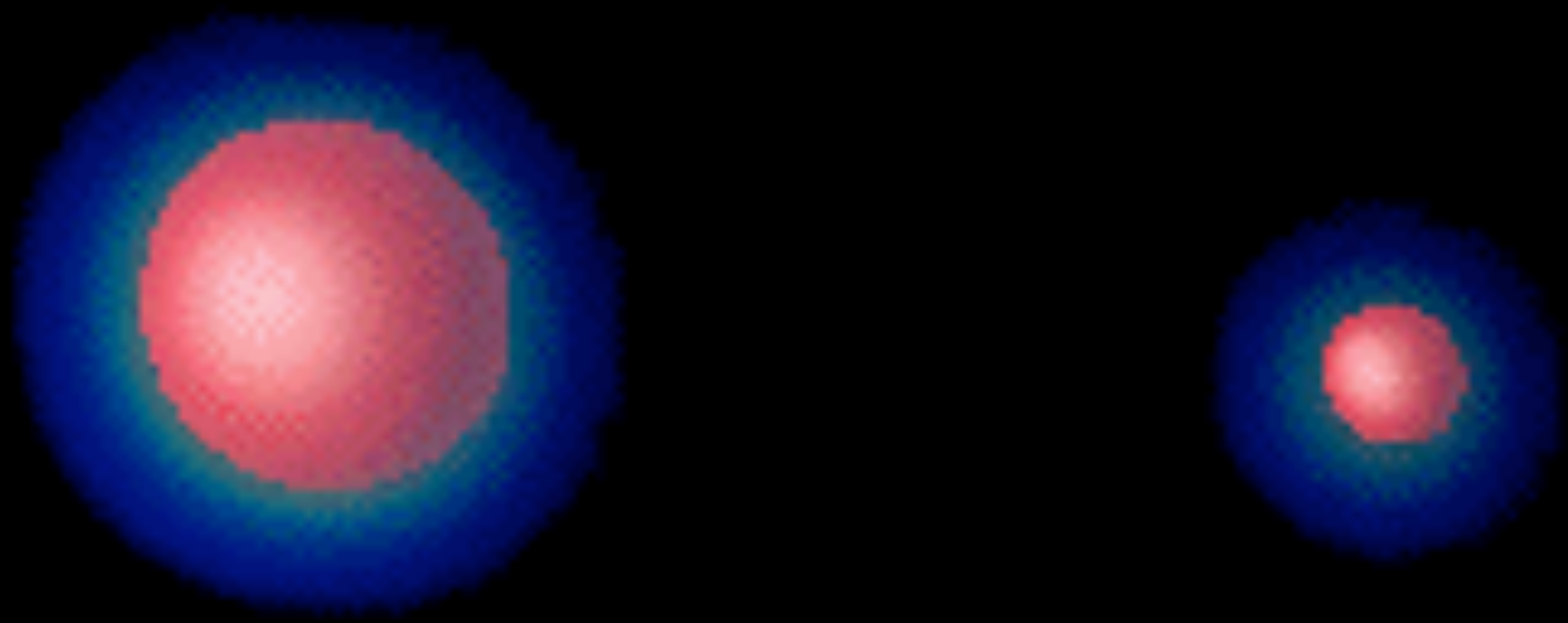
(exp: V_B=74.5 MeV)





Average nucleon number in transfer reactions

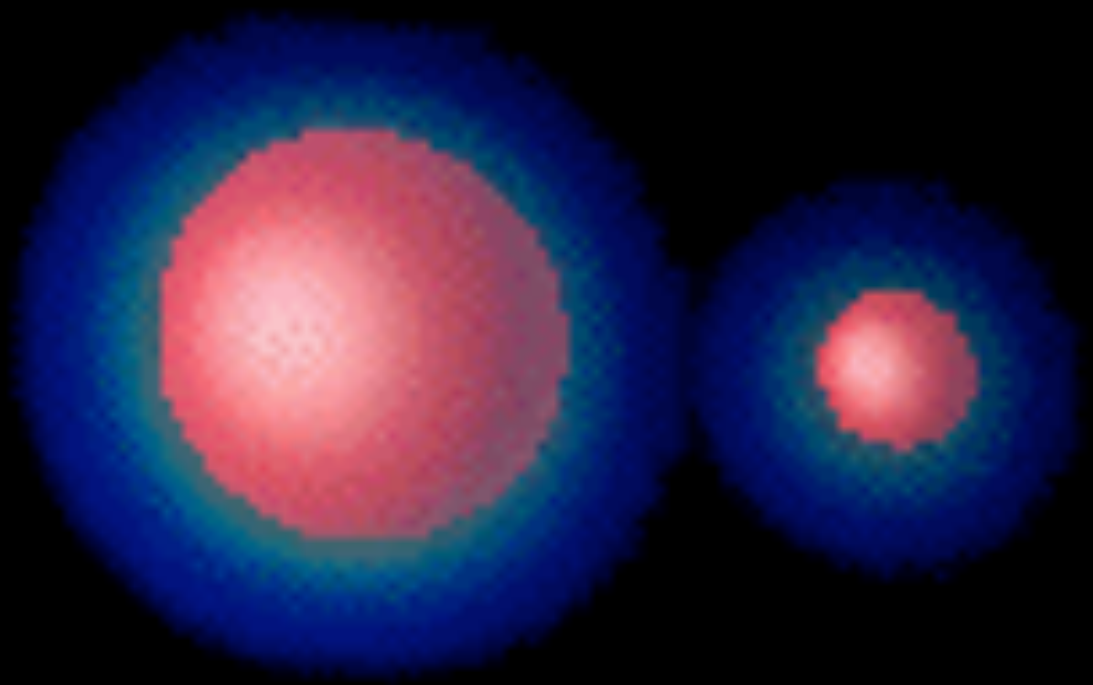
$^{208}Pb + ^{16}O$ 74.44 MeV



C.S., PRL 2010

Average nucleon number in transfer reactions

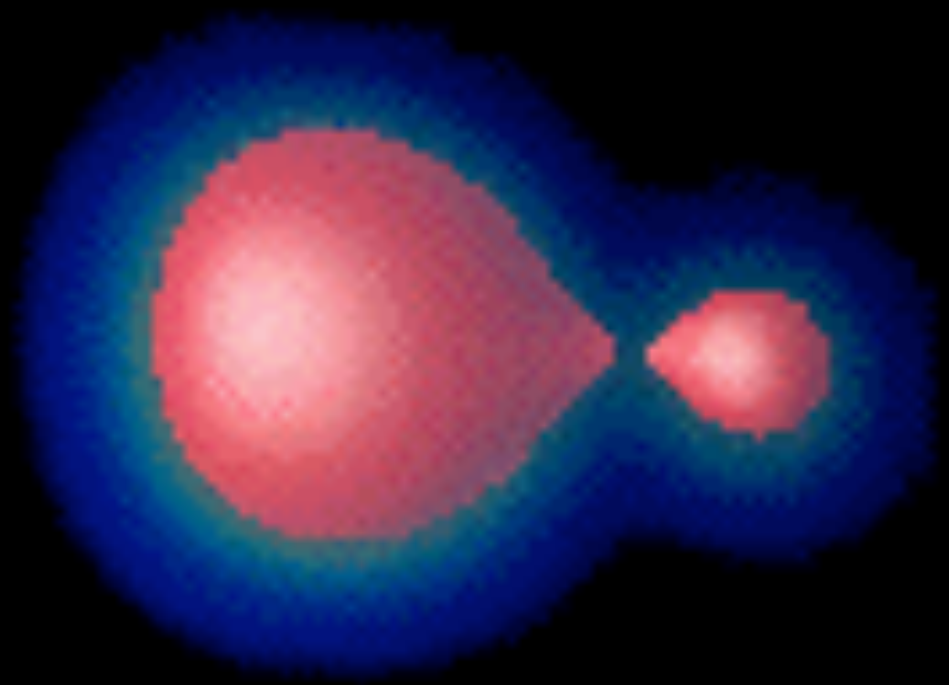
$^{208}Pb + ^{16}O$ 74.44 MeV



C.S., PRL 2010

Average nucleon number in transfer reactions

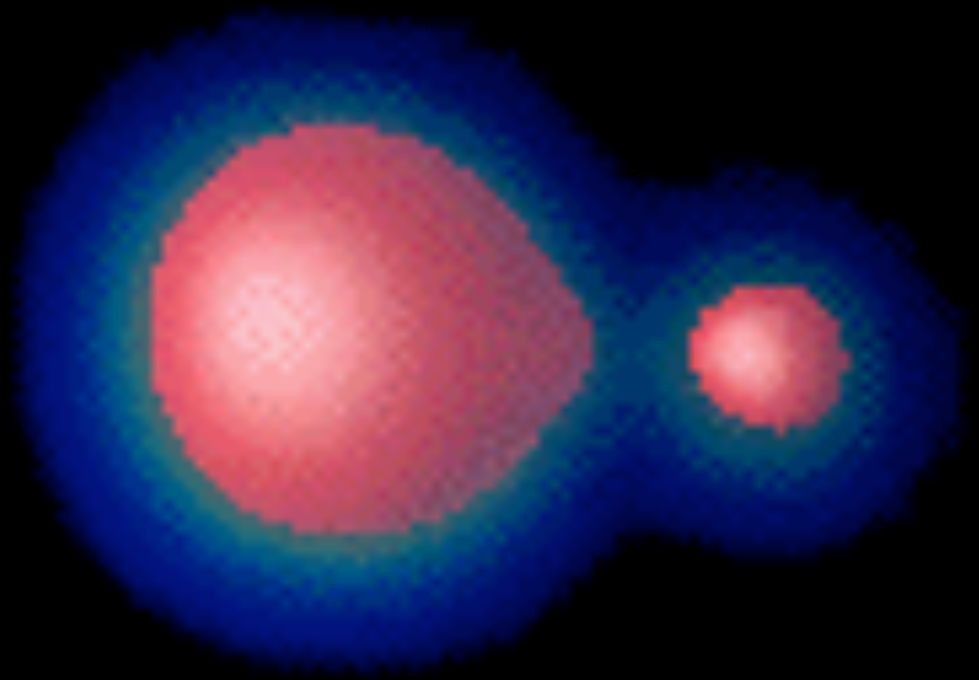
$^{208}Pb + ^{16}O$ 74.44 MeV



C.S., PRL 2010

Average nucleon number in transfer reactions

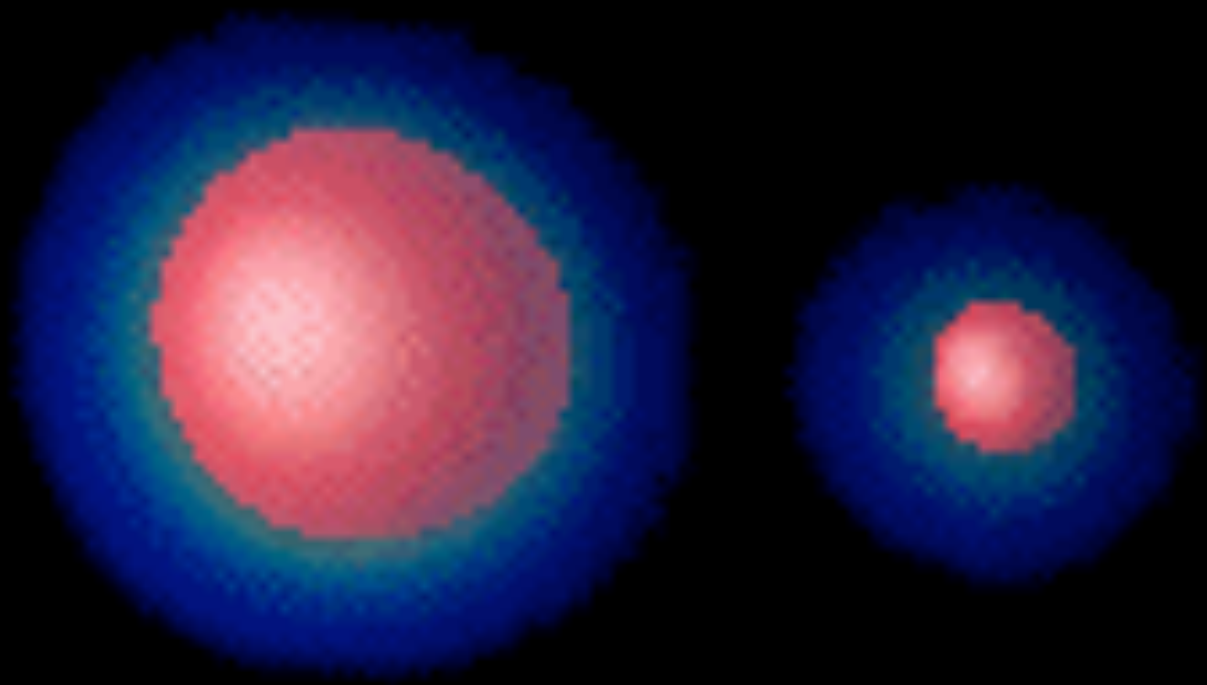
$^{208}Pb + ^{16}O$ 74.44 MeV



C.S., PRL 2010

Average nucleon number in transfer reactions

$^{208}Pb + ^{16}O$ 74.44 MeV



C.S., PRL 2010

Average nucleon number in transfer reactions

$^{208}Pb + ^{16}O$ 74.44 MeV

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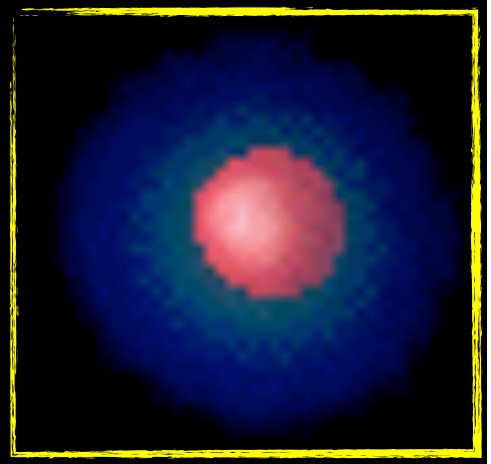
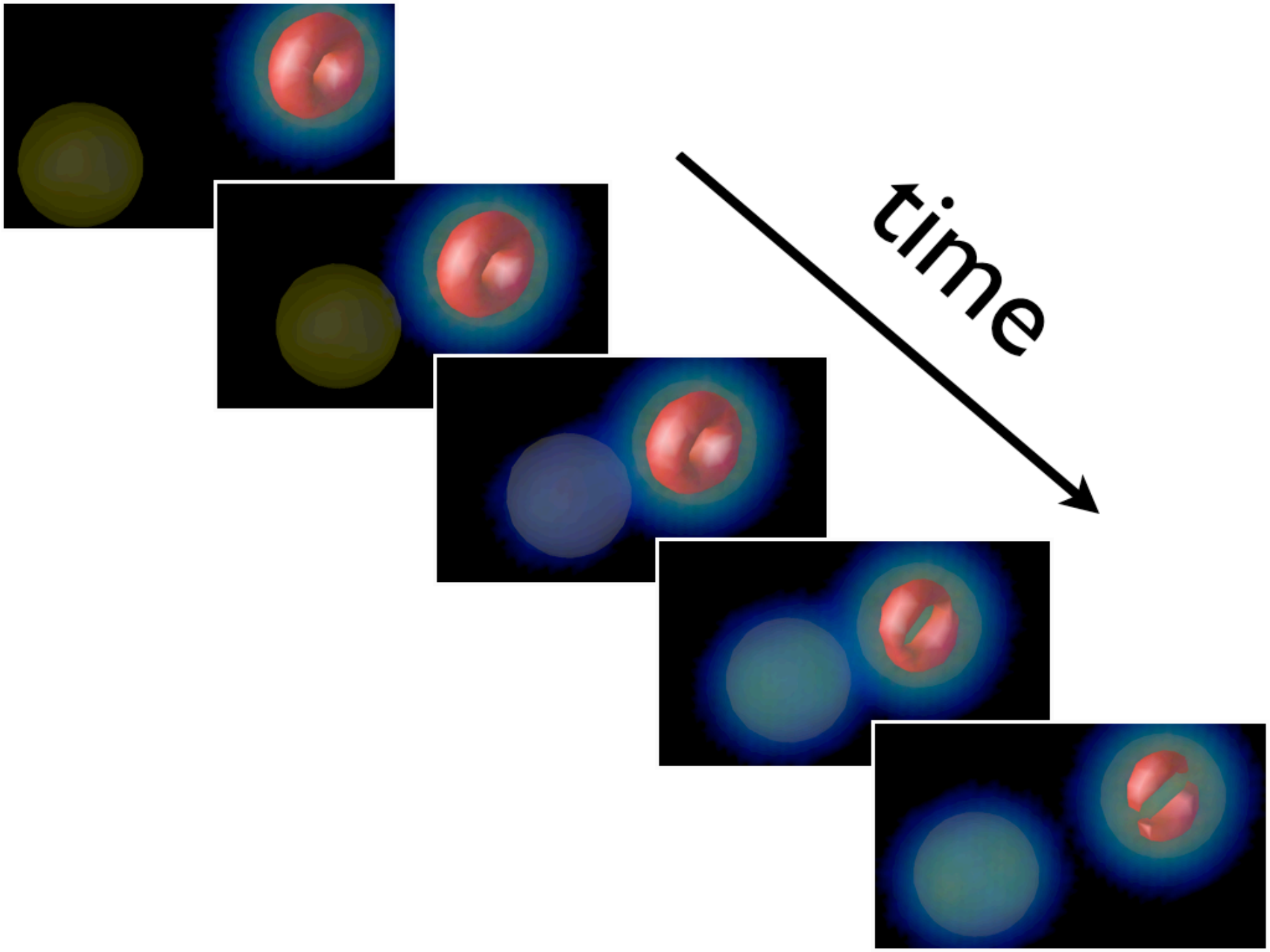
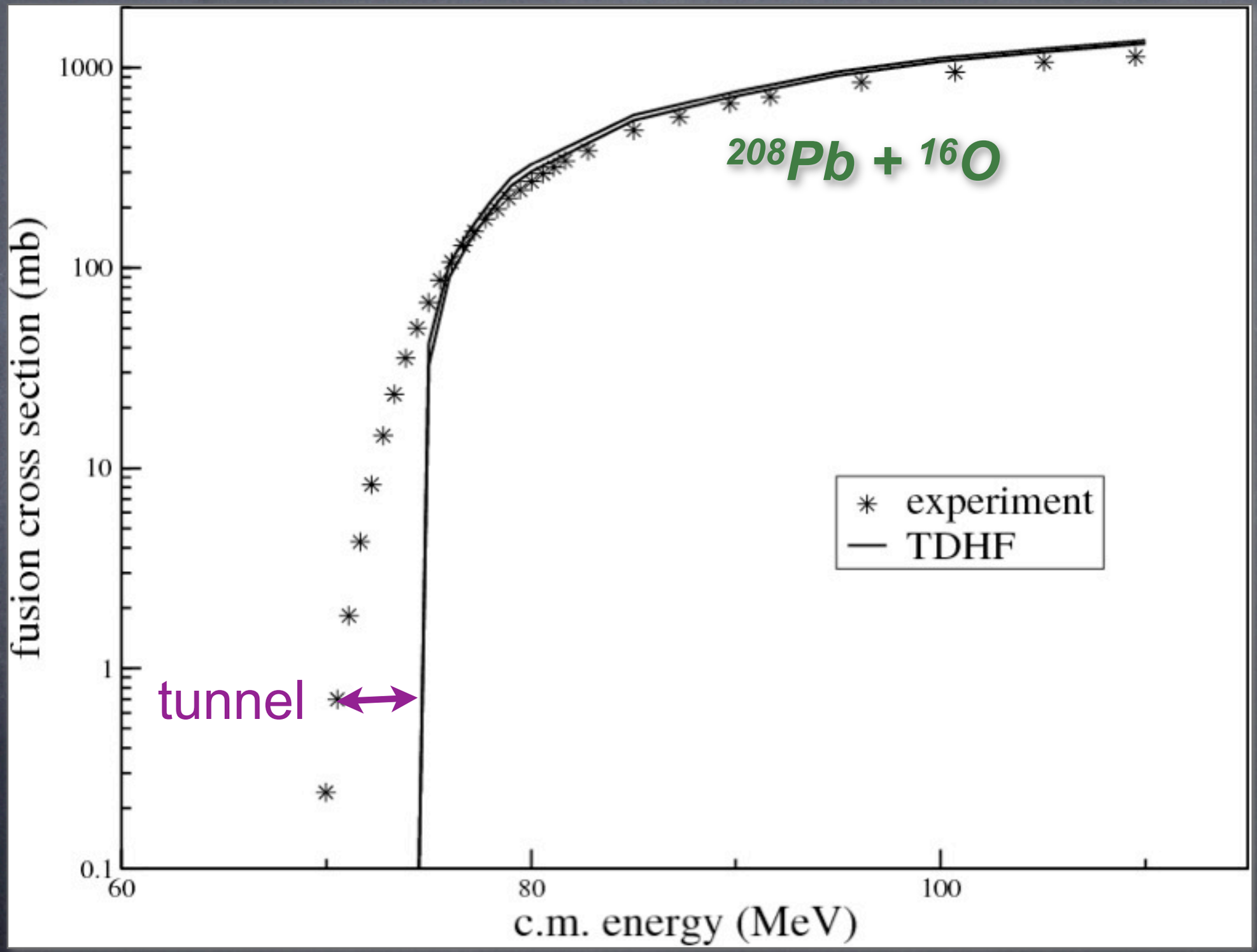


C.S., PRL 2010


time

Fusion with TDHF