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Departamento de Física Atómica Molecular y Nuclear
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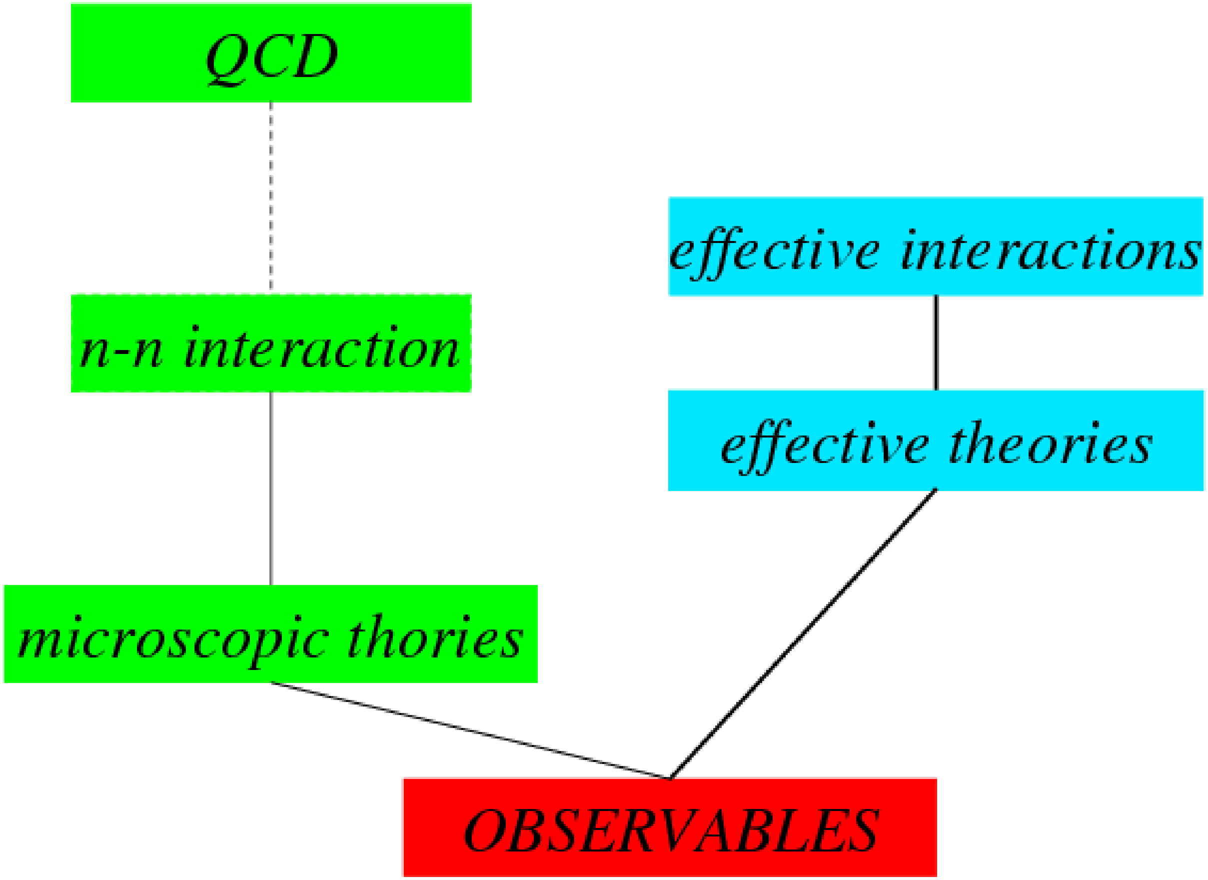
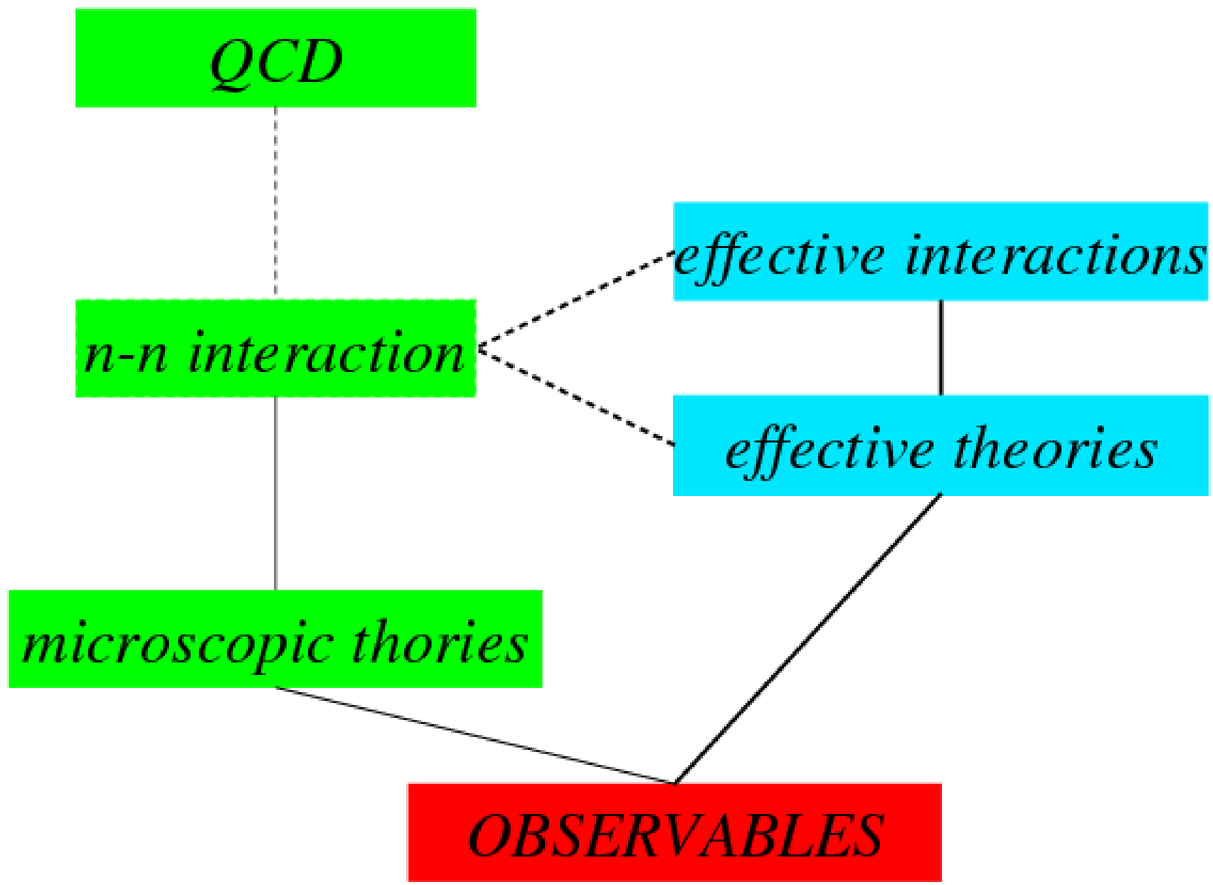

QCD
n-n interaction
microscopic thories
effective interactions
effective theories
OBSERVABLES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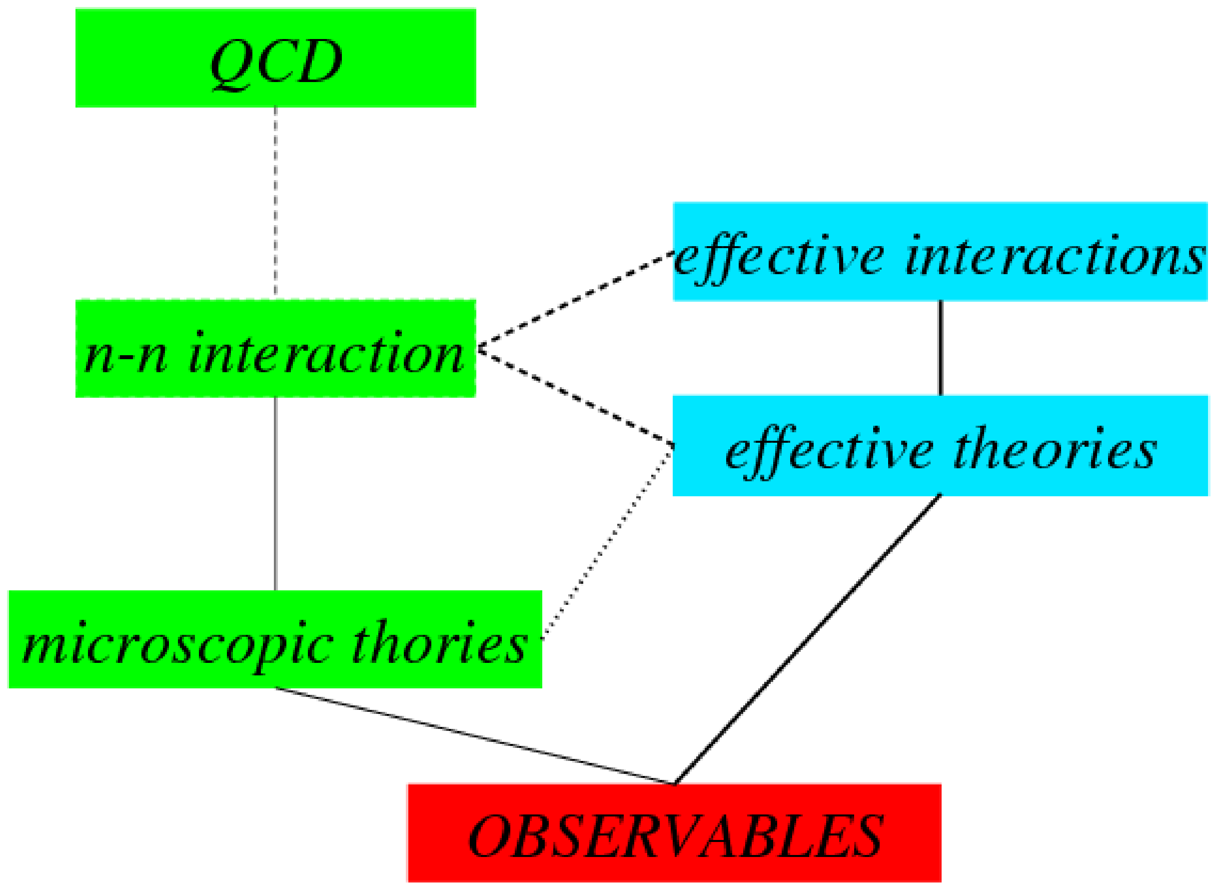
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G. Co', V. De Donno, P. Finelli, M. Anguiano, A. M. Lallena, C. Giusti, A. Meucci, F. D. Pacati
Mean-field calculations of the ground states of exotic nuclei
Phys. Rev. C 85 (2012) 024322

G. Co', V. De Donno, M. Anguiano, A. M. Lallena
Magnetic excitations in nuclei with neutron excess
Phys. Rev. C 85 (2012) 034323

D. Gambacurta, M. Grasso, V. De Donno, G. Co', F. Catara
Second random-phase approximation with teh Gogny force:First applications
Phys. Rev. C 86 (2012) 021304(R)

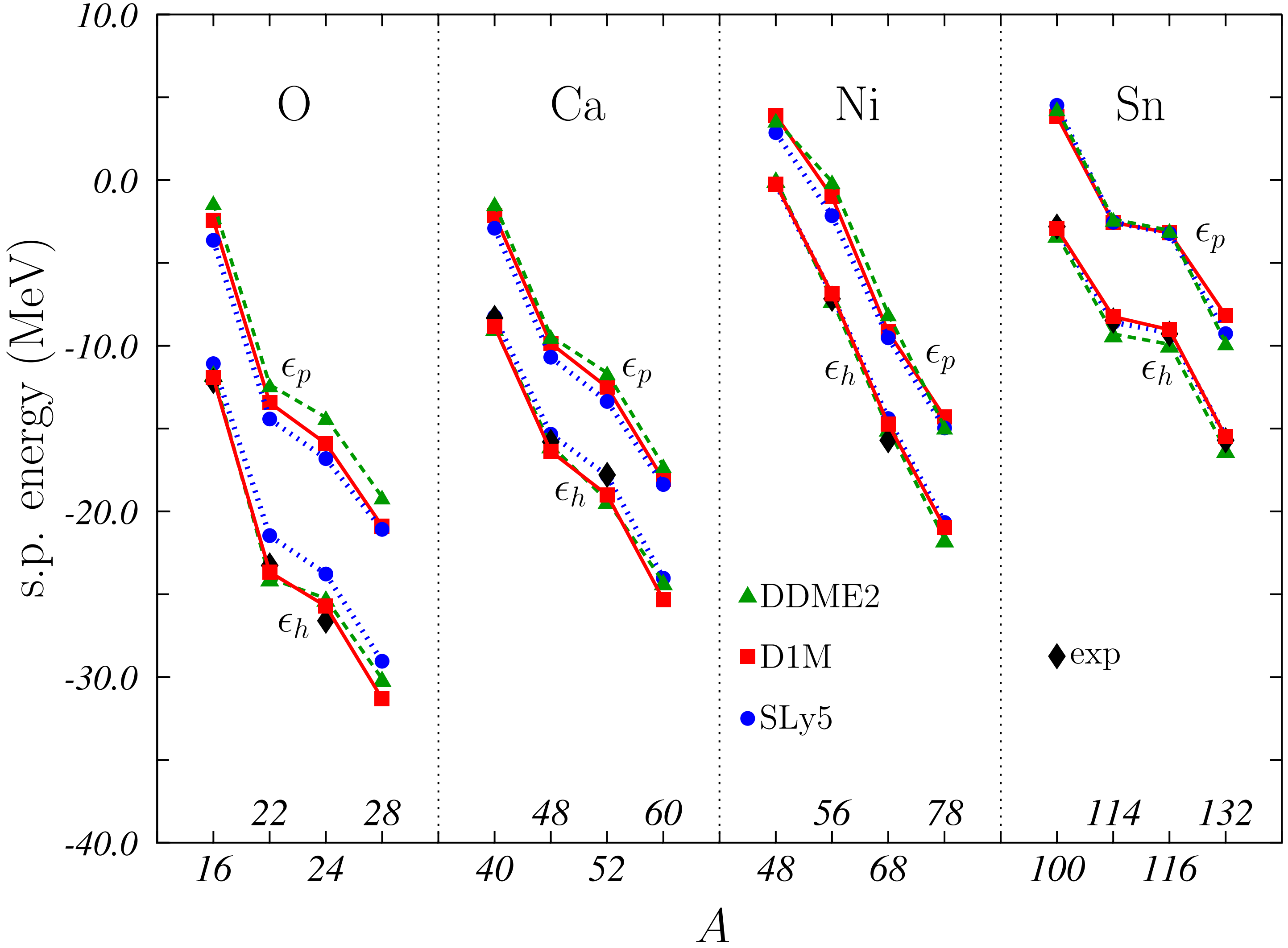
M. Anguiano, M. Grasso, G. Co', V. De Donno, A. M. Lallena
Tensor and tensor-isospin terms in the effective Gogny interaction Phys.

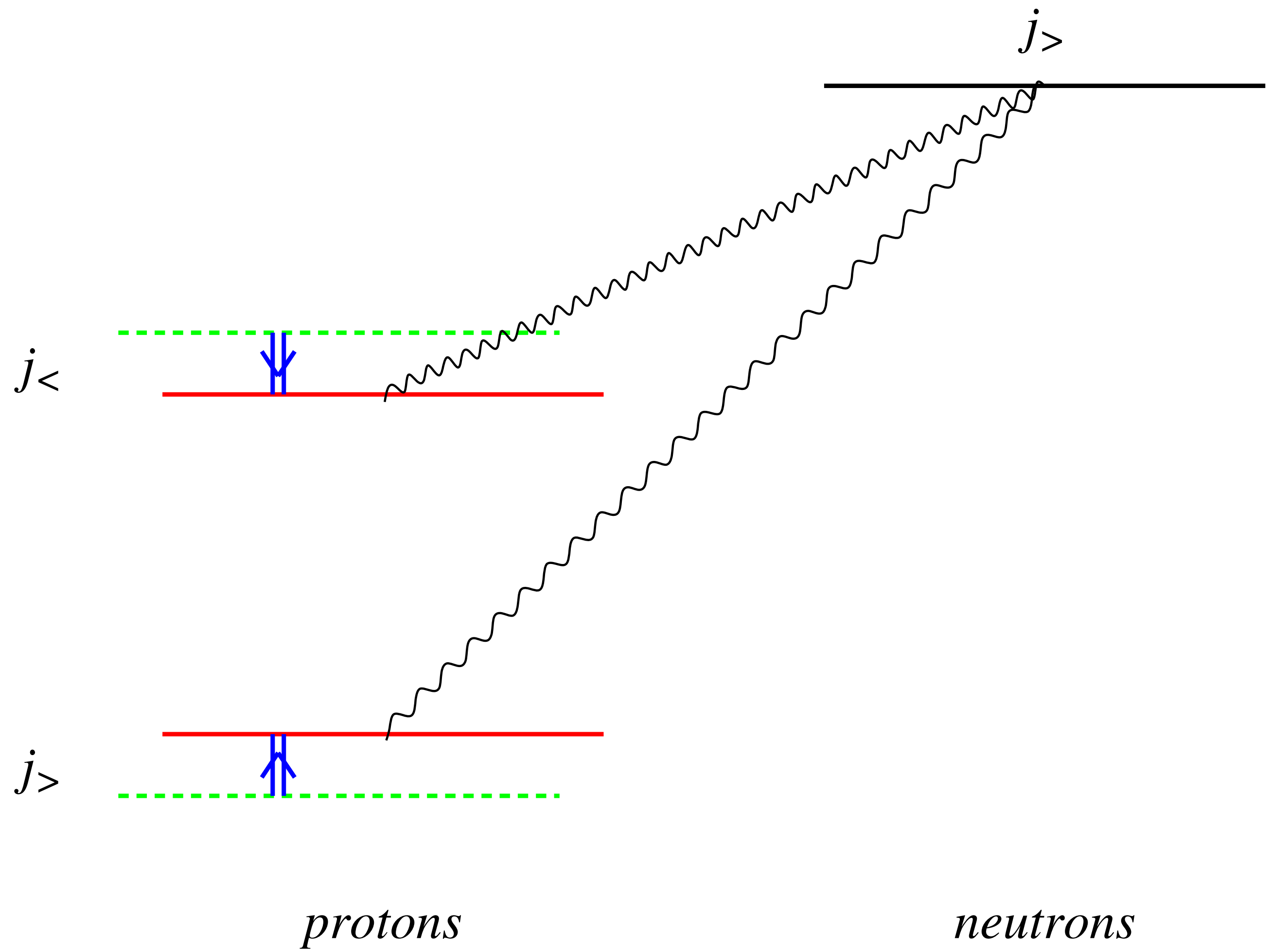
Rev. C 86 (2012) 054302

G. Co', V. De Donno, M. Anguiano, A. M. Lallena
Nuclear proton and neutro distributions in the detection of weak interacting massive particles
Journal od Cosmology and Astroparticle Physics 11 (2012) 010

G. Co', V. De Donno, M. Anguiano, A. M. Lallena
Pygmy and giant electric dipole responses of medium-heavy nculei in a self-consistent random-phase approximation approach with finite-range interaction
Phys. Rev. C 87 (2013) 034305

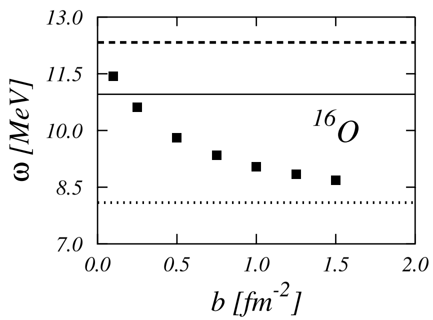
G. Co', V. De Donno, P. Finelli, M. Anguiano, A. M. Lallena, C. Giusti, A. Meucci, F. D. Pacati, Phys. Rev. C 85 (2012) 024322

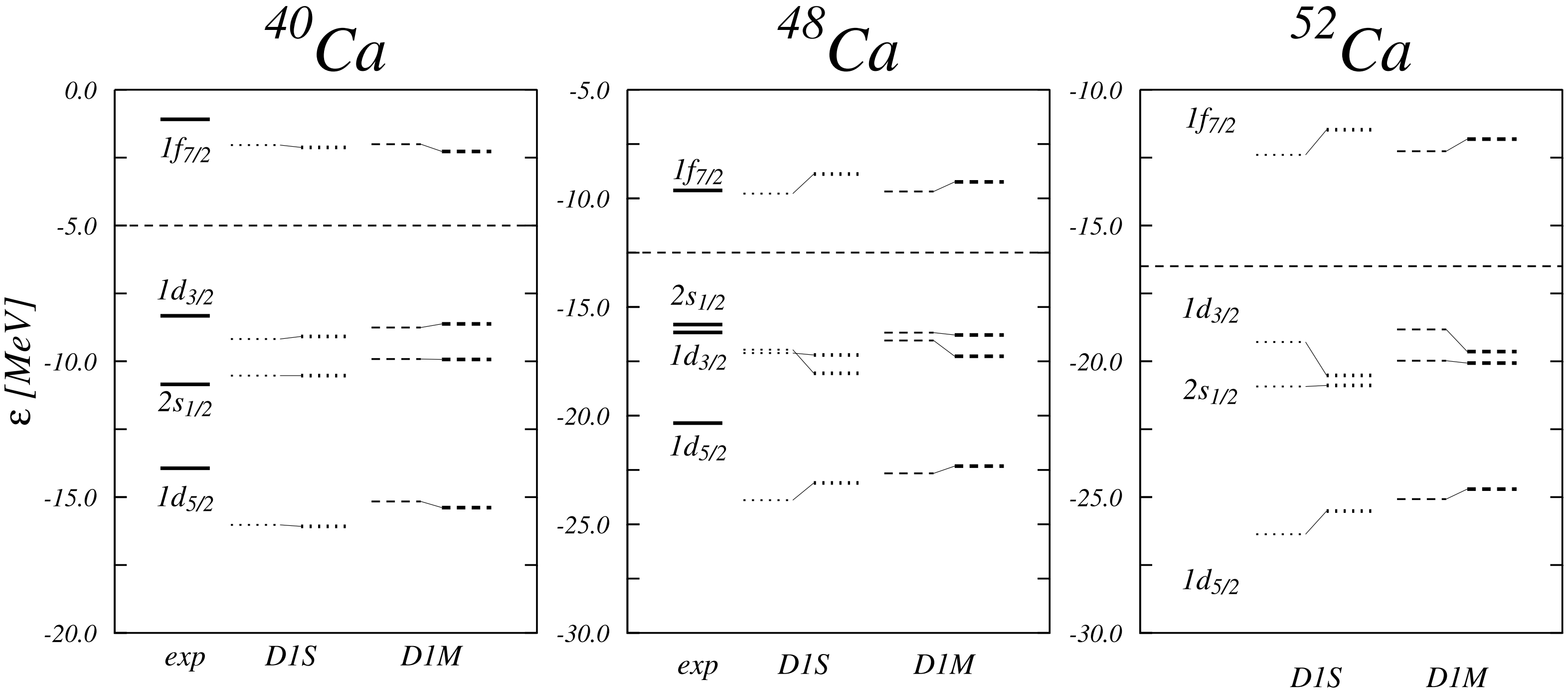


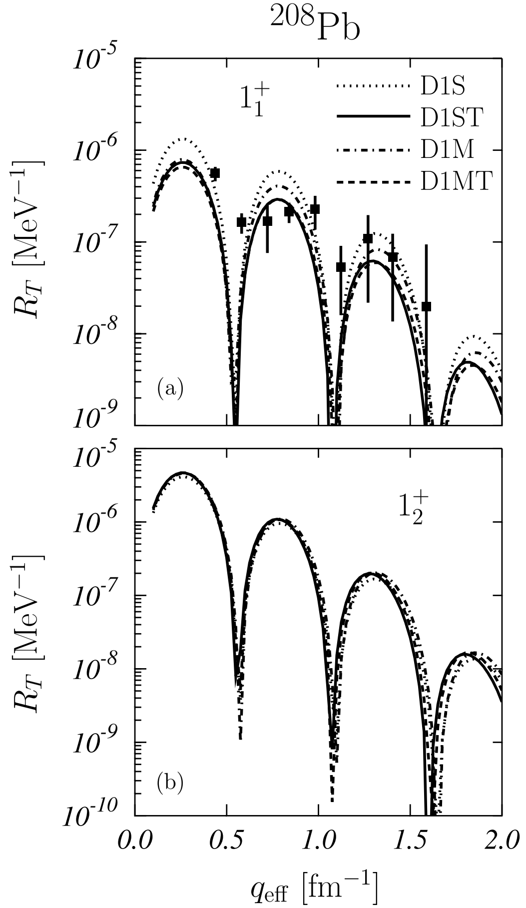


$j_>$
$j_<$
$j_>$
protons
neutrons

$$v_b^{t\tau}(r) = v_{AV8'}^{t\tau}(r)(1 - e^{br^2})$$





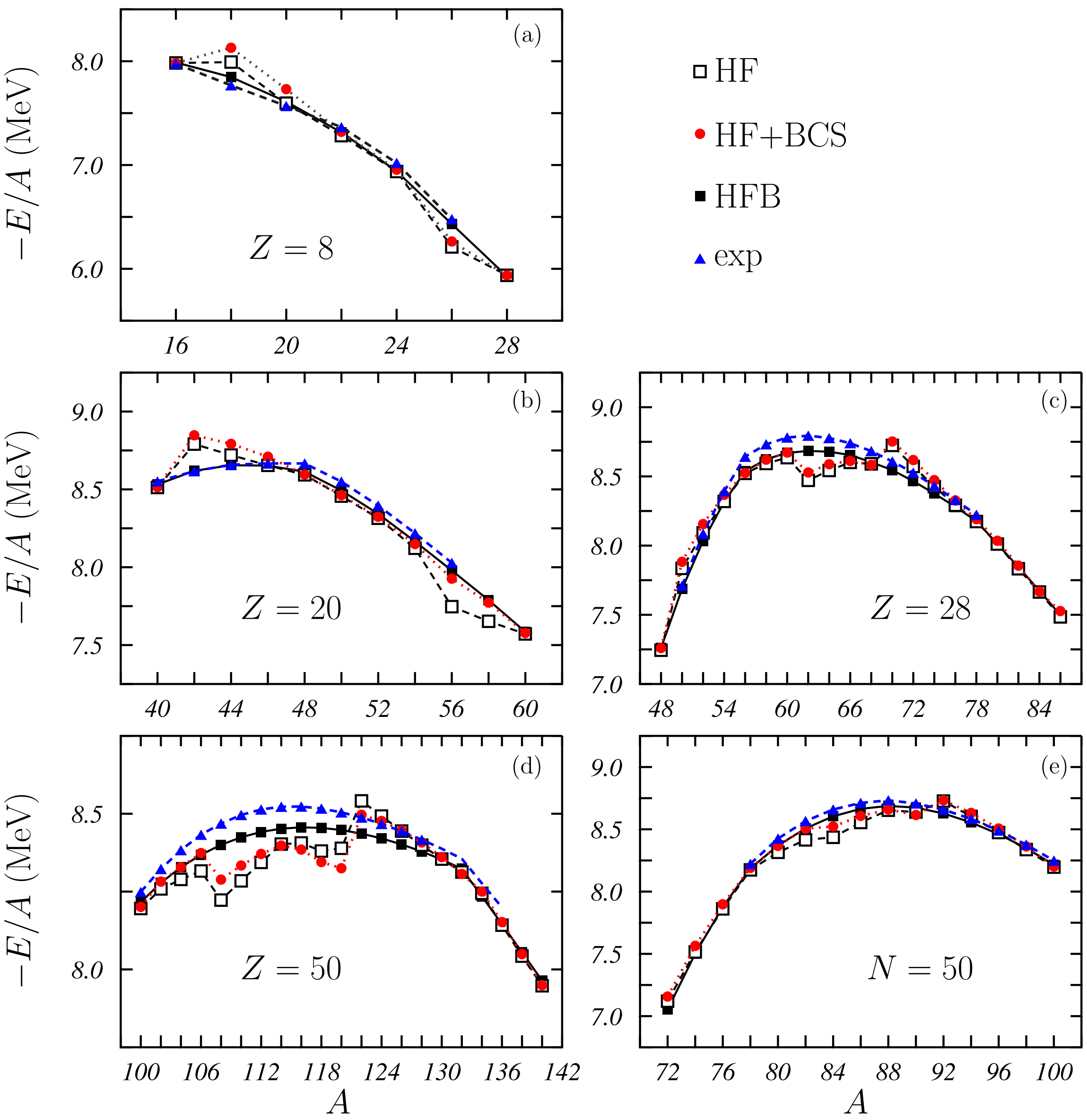


208Pb
1+1
D1S
D1ST
D1M
D1MT
(a)
1+2
(b)
R_T [MeV−1]
q_eff [fm−1]
10-5
10-6
10-7
10-8
10-9
10-10
0.0
0.5
1.0
1.5
2.0

Fully self-consistent HF+RPA calculations. Spin-orbit and Coulomb terms.

Pairing in HF+BCS approach.

Quasi-particle RPA theory.

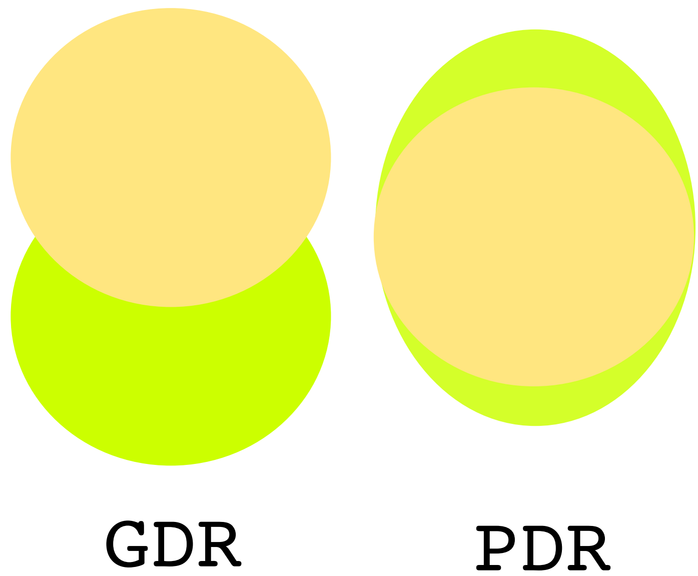


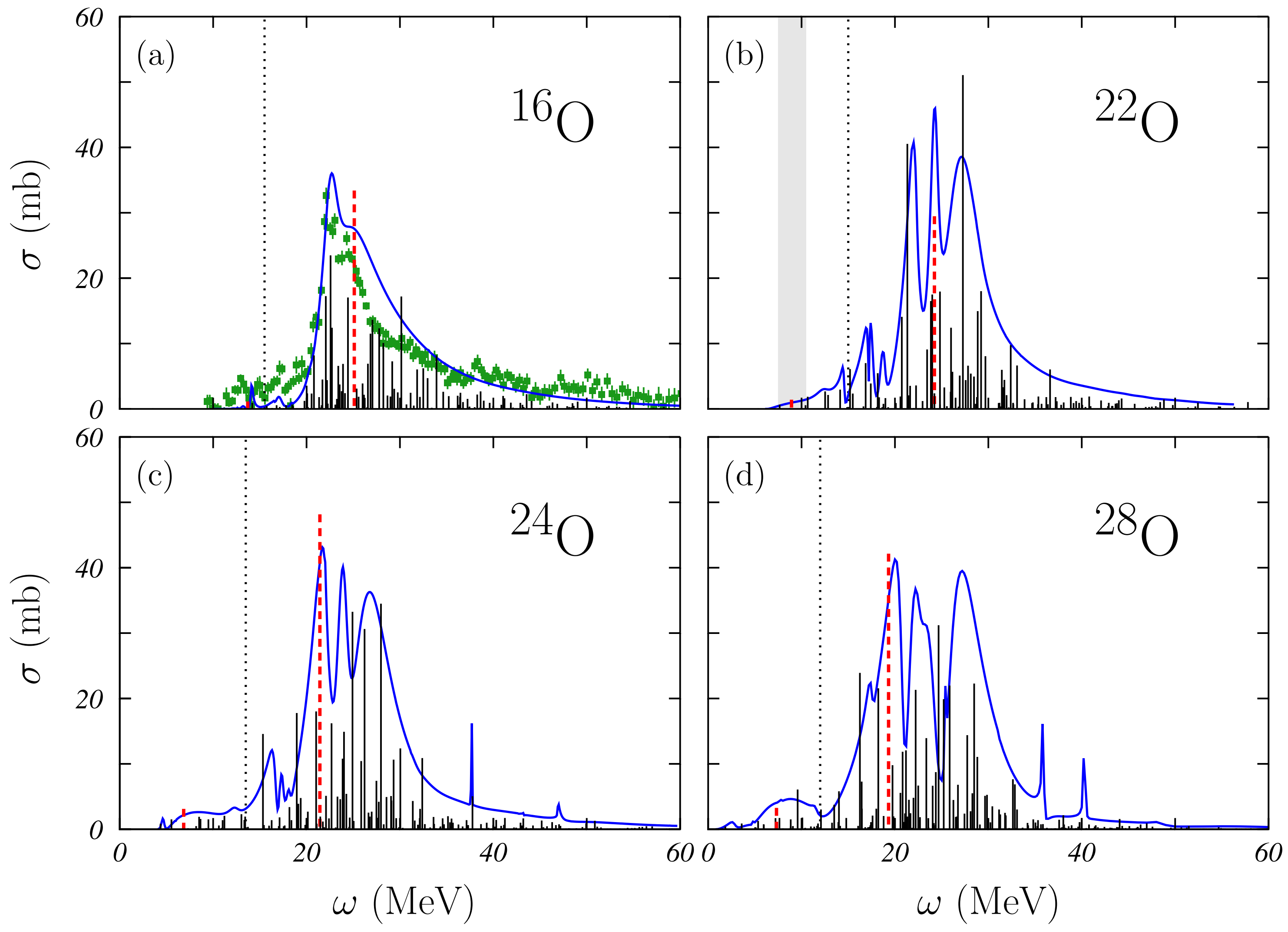
(a)
(b)
(c)
(d)
(e)
Z = 8
Z = 20
Z = 28
Z = 50
N = 50
HF
HF+BCS
HFB
exp
−E/A (MeV)
A

Nucleosynthesis r-processes

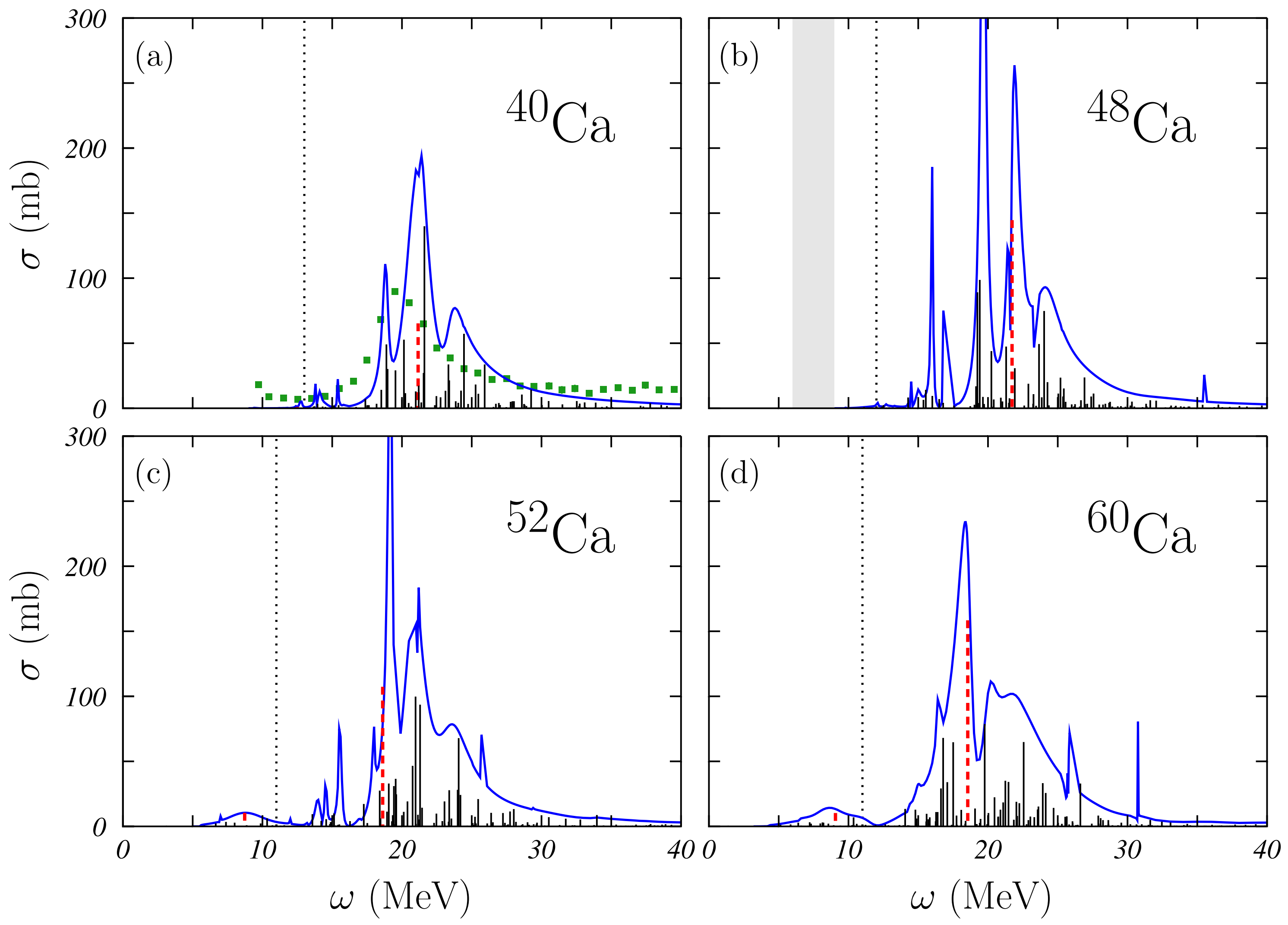
Nuclear matter symmetry energy

New nuclear excitation mode

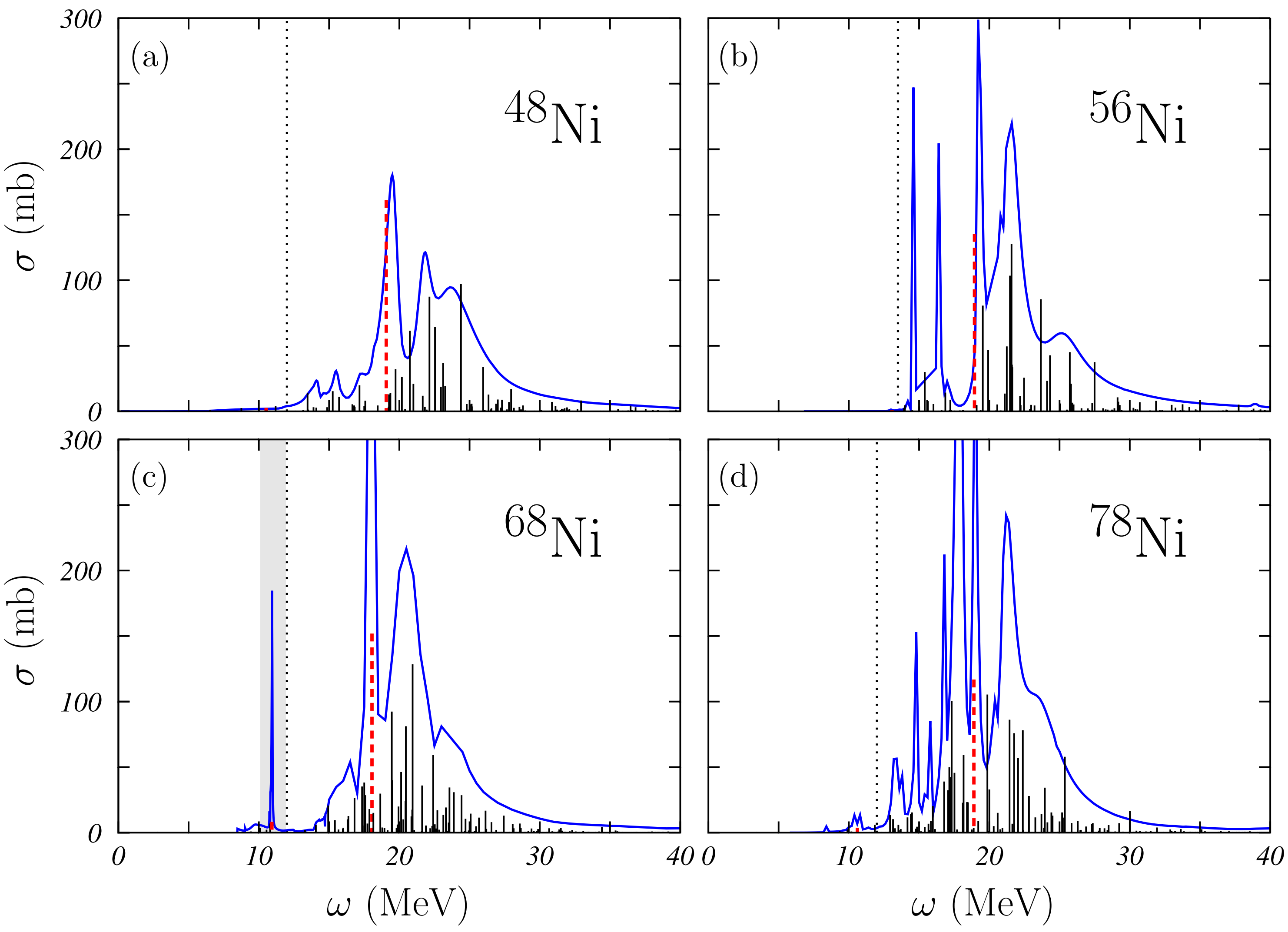


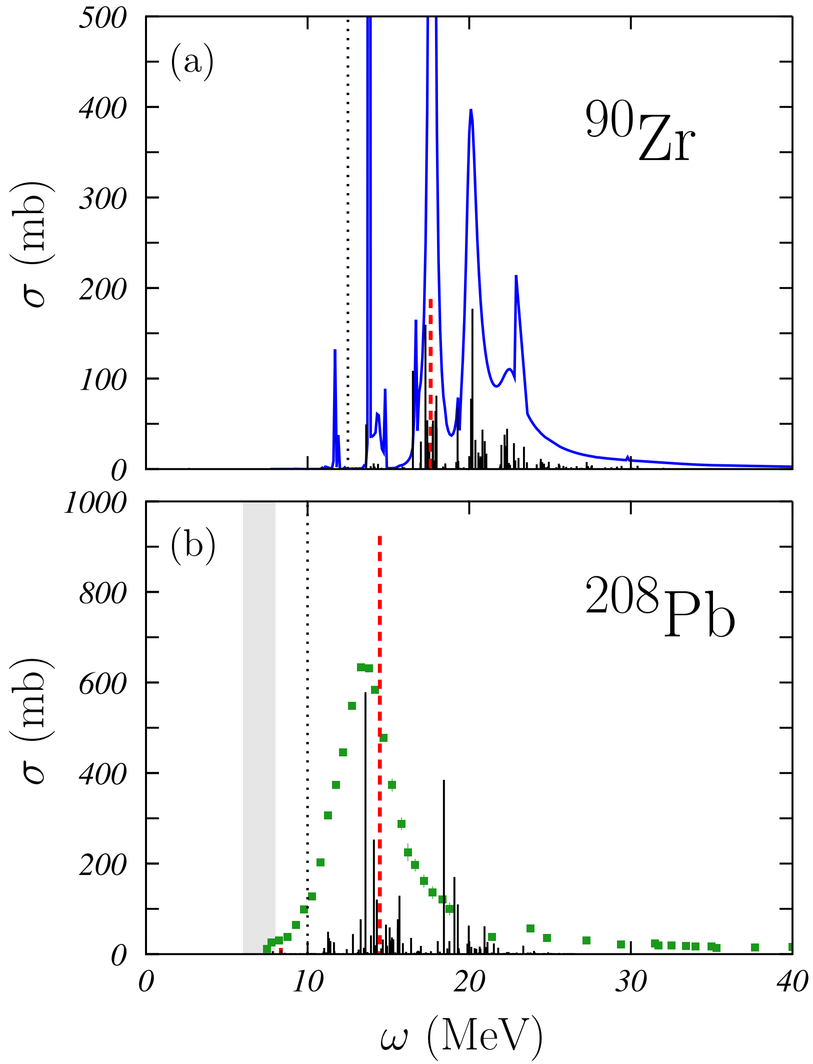


(a)
16O
(b)
22O
(c)
24O
(d)
28O
σ (mb)
σ (mb)
ω (MeV)
ω (MeV)
0
20
40
60
0
20
40
60
0
20
40
60
0
20
40
60

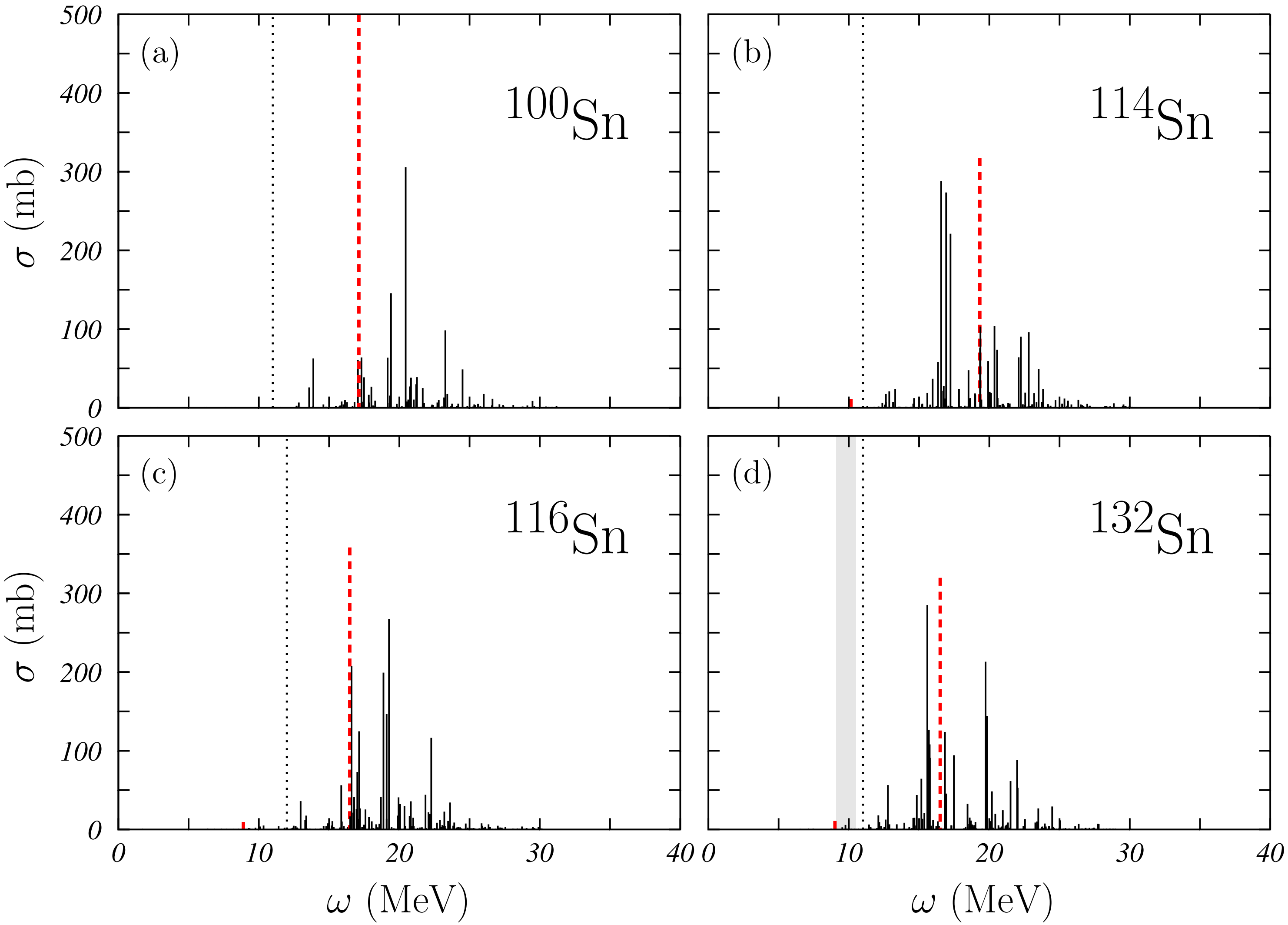


(a)
^{40}Ca
(b)
^{48}Ca
(c)
^{52}Ca
(d)
^{60}Ca
σ (mb)
ω (MeV)

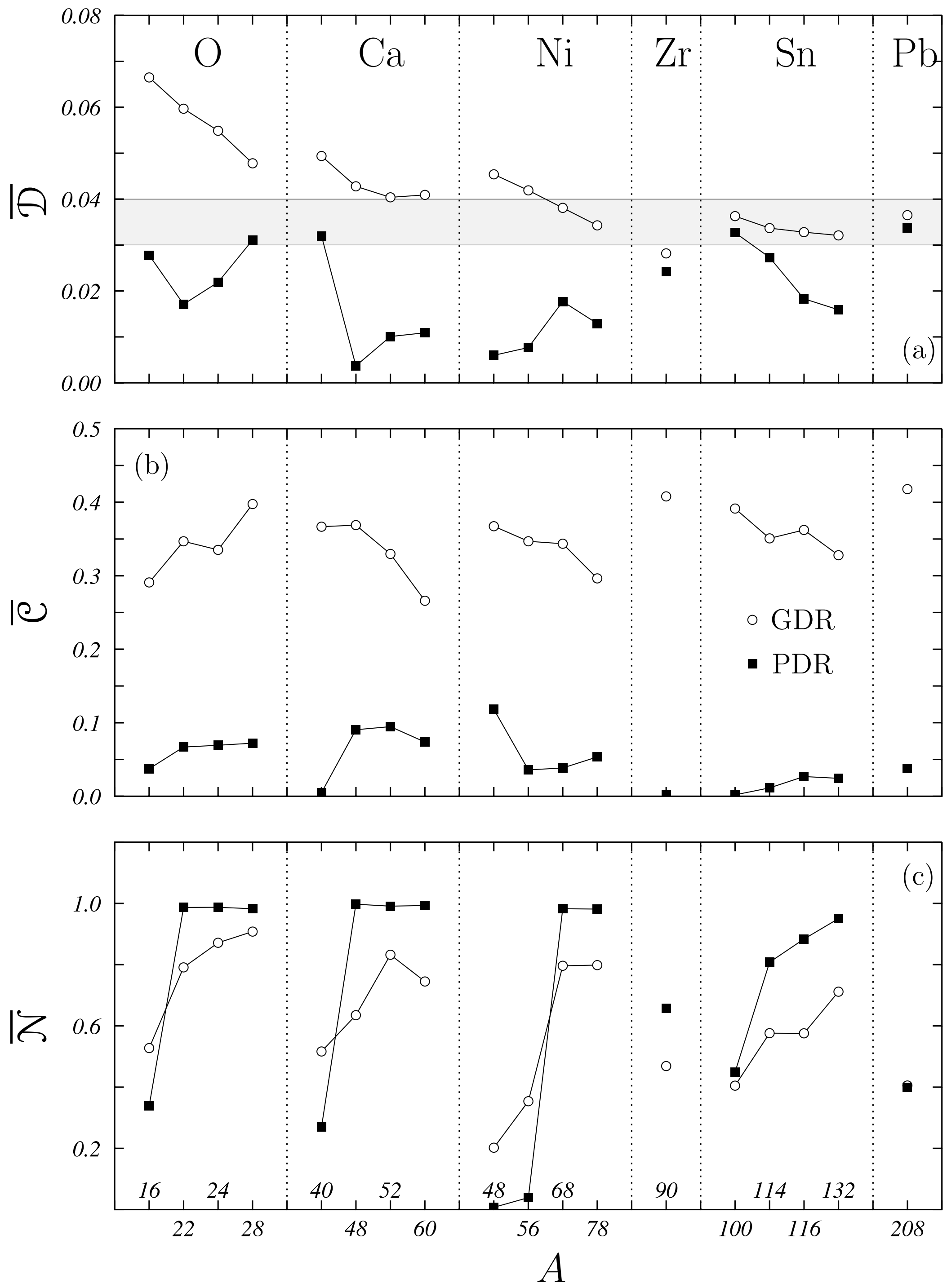

(a)
^{48}Ni
(b)
^{56}Ni
(c)
^{68}Ni
(d)
^{78}Ni
σ (mb)
ω (MeV)
0
100
200
300
10
20
30
40

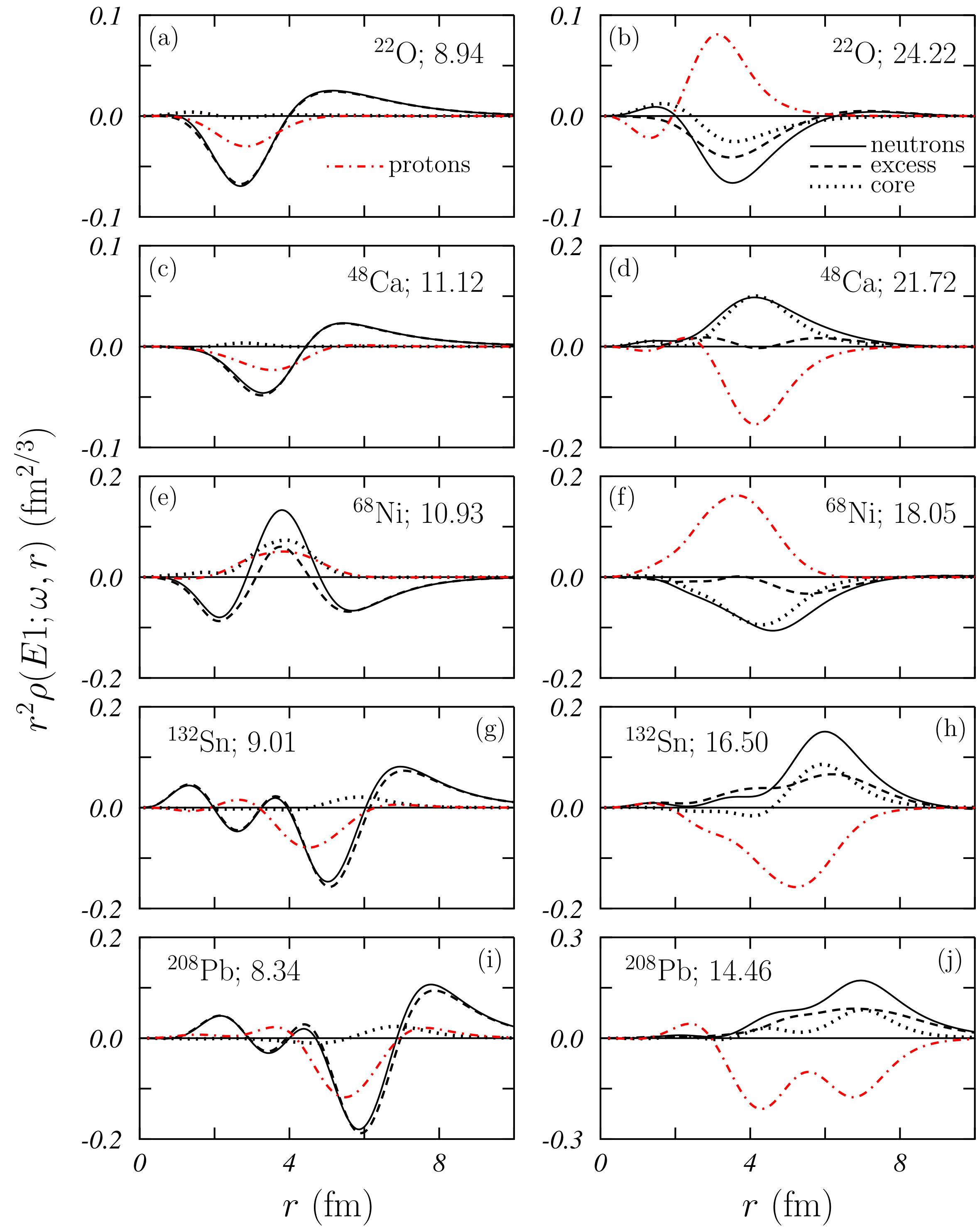


(a)
^{90}Zr
(b)
^{208}Pb
σ (mb)
ω (MeV)



(a)
100Sn
(b)
114Sn
(c)
116Sn
(d)
132Sn
σ (mb)
ω (MeV)
0
100
200
300
400
500
10
20
30
40


O
Ca
Ni
Zr
Sn
Pb
(a)
(b)
(c)
GDR
PDR
A



(a)
^{22}O; 8.94
protons
(b)
^{22}O; 24.22
neutrons
excess
core
(c)
^{48}Ca; 11.12
(d)
^{48}Ca; 21.72
(e)
^{68}Ni; 10.93
(f)
^{68}Ni; 18.05
(g)
^{132}Sn; 9.01
(h)
^{132}Sn; 16.50
(i)
^{208}Pb; 8.34
(j)
^{208}Pb; 14.46
$r^2\rho(E1;\omega,r)$ (fm$^{2/3}$)
r (fm)

- The dipole strength at energies around the nucleon emission threshold increases with the neutron excess.
- The PDR exhausts about 5% of the total energy weighted sum rule, while the GDR about the 90%.
- GDRs are more collective than the PDRs.
- The PDR is dominated by the neutron p-h excitations, while in the GDR the contributions of both proton and neutron excitations are comparable.
-At the nuclear surface, proton and neutron transition densities are in phase in the PDR region, while they are out of phase in the GDR region.