# CORRELATIONS
# and
# ELECTROMAGNETIC KNOCKOUT REACTIONS

C. GIUSTI
Università di Pavia

- SHORT-RANGE CORRELATIONS SRC
- TENSOR CORRELATIONS TC
- LONG-RANGE CORRELATIONS LRC

A consistent treatment of the combined effect of all types of correlations is necessary

# ONE-NUCLEON KNOCKOUT

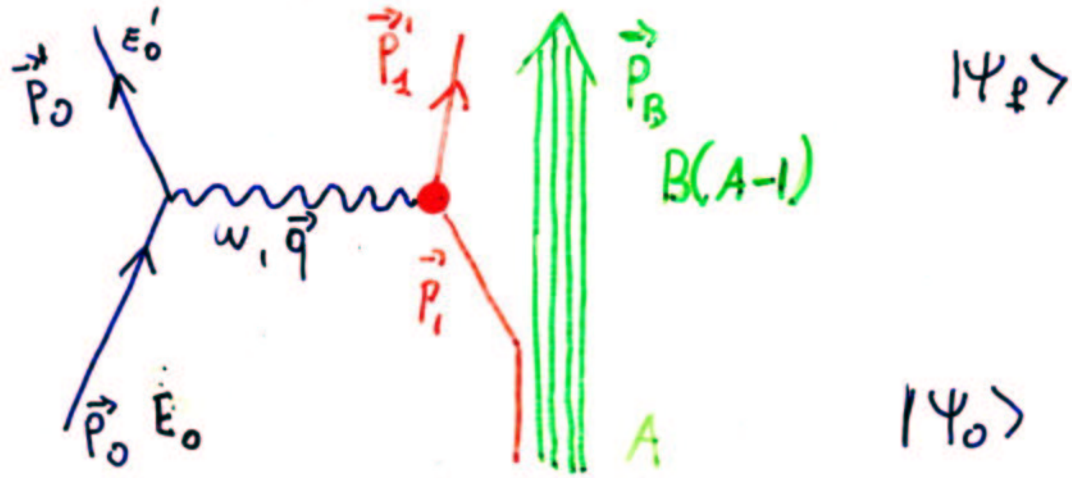

(e, e'p)

- properties of bound nucleons
- independent particle shell model IPSM
- validity and limit of IPSM

⇓

- NN- correlations

# ONE-NUCLEON KNOCKOUT $(e, e' N)$




$$q_\nu^2 = \omega^2 - \vec{q}^{\,2}$$

$$E_m = \omega - \frac{\vec{p}_1^{\,\prime 2}}{2m} - \frac{\vec{p}_B^{\,2}}{2(A-1)m} = W_B^* - W_A \qquad \text{missing energy}$$

$$\vec{p}_m = \vec{q} - \vec{p}_1^{\,\prime} = -\vec{p}_1 = \vec{p}_B \qquad \text{missing momentum}$$

## ONE-HOLE SPECTRAL DENSITY FUNCTION

$$\boxed{S(\vec{p}_1, \vec{p}_1, E_m)} = \langle \Psi_0 | a^+_{\vec{p}_1} \delta(E_m - H) a_{\vec{p}_1} | \Psi_0 \rangle$$

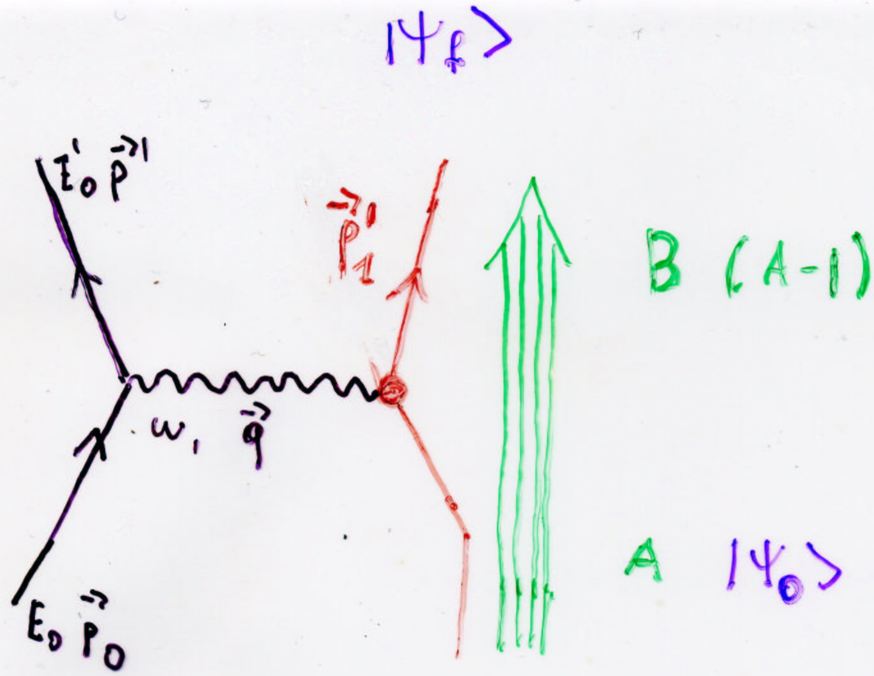
$$\int S(\vec{p}_1, \vec{p}_1, E_m)\, dE_m = \boxed{\rho(\vec{p}_1, \vec{p}_1)} \qquad \text{ONE-BODY DENSITY}$$

$$\boxed{\vec{p}_1 = \vec{p}_1} \quad \Longrightarrow \quad \rho_1(\vec{p}_1, \vec{p}_1) = \boxed{F(\vec{p}_1)}$$

MOMENTUM DISTRIBUTION

$$F(\vec{p}_1) = \int |\Psi_0(\vec{p}_1, \vec{p}_2 \ldots \vec{p}_A)|^2 \, d\vec{p}_2 \ldots d\vec{p}_A$$

$A(e,e'N)B$

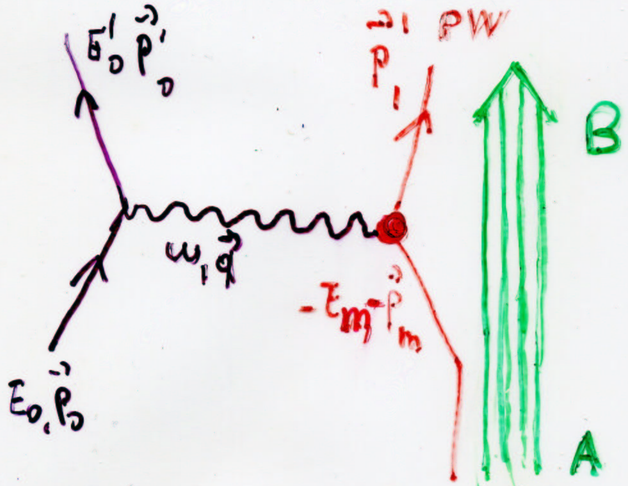



- $\sigma = K \, \rho_{\mu\nu} \, W^{\mu\nu}$

K KIN. FACTOR

- $\rho_{\mu\nu}$ LEPTON TENSOR
- $W^{\mu\nu}$ HADRON TENSOR
- $W^{\mu\nu} = \overline{\sum_{if}} J^{\mu}(\vec{q}) \, J^{\nu *}(\vec{q}) \; \delta(E_i - E_f)$
- $J^{\mu}(\vec{q}) = \int e^{i\vec{q}\cdot\vec{r}} \langle \Psi_f | \hat{j}^{\mu}(\vec{r}) | \Psi_0 \rangle \, d\vec{r}$

# PLANE WAVE IMPULSE APPROXIMATION




PWIA

$(e, e'p)$

FSI = 0

FACTORIZED CROSS SECTION

$$\sigma = K \, \sigma_{e-p} \, S(E_m, -\vec{p}_m)$$

$$S(E_m, -\vec{p}_m) = \sum_\alpha S_\alpha(E_m) \, |\phi_\alpha(-\vec{p}_m)|^2$$

- At each $E_m$ the mom. dependence of the S.F. is given by the mom. distribution of the quasi-hole states $\alpha$ produced in the target nucleus at that energy and described by the normalized OVF $\phi_\alpha$ ...
- The spectroscopic factor $S_\alpha$ gives the probability that $\alpha$ is a pure hole-state in the target

IPSM $\Rightarrow$ $\phi_\alpha$ = s.p SM state

$S_\alpha$ = 1 occupied, 0 empty — SM states

In reality there are correlations and the strength of $\alpha$ is fragmented over a set of s.p. states $0 \le S_\alpha \le 1$

$$J^{\mu}(\vec{q}) = \int d\vec{r}\; e^{i\vec{q}\cdot\vec{r}} \langle \Psi_f | \hat{J}^{\mu}(\vec{r}) | \Psi_0 \rangle$$

- EXCLUSIVE PROCESS
- DKO MECHANISM IA

$$\boxed{J^{\mu}(\vec{q}) = \int d\vec{r}_1\; e^{i\vec{q}\cdot\vec{r}_1} \chi^{(-)*}(\vec{r}_1)\, J^{(1)\mu}(\vec{r}_1)\, S^{1/2}\varphi(\vec{r}_1)}$$

DWIA

- $J^{(1)\mu}(\vec{r}_1)$ 1-body nuclear current
- $\chi^{(-)}(\vec{r}_1)$ scattering state eigenstate of $\mathcal{H}^{+}(T'_1)$ $\epsilon\, T'_1$
- $S^{1/2}\varphi(\vec{r}_1)$ bound state overlap function eigenstate of $\mathcal{H}(-E_m)$ $\epsilon\; -E_m$

$\mathcal{H}$ is the Feshbach optical Hamiltonian

## DWIA CALCULATIONS (e,e′p) analysis

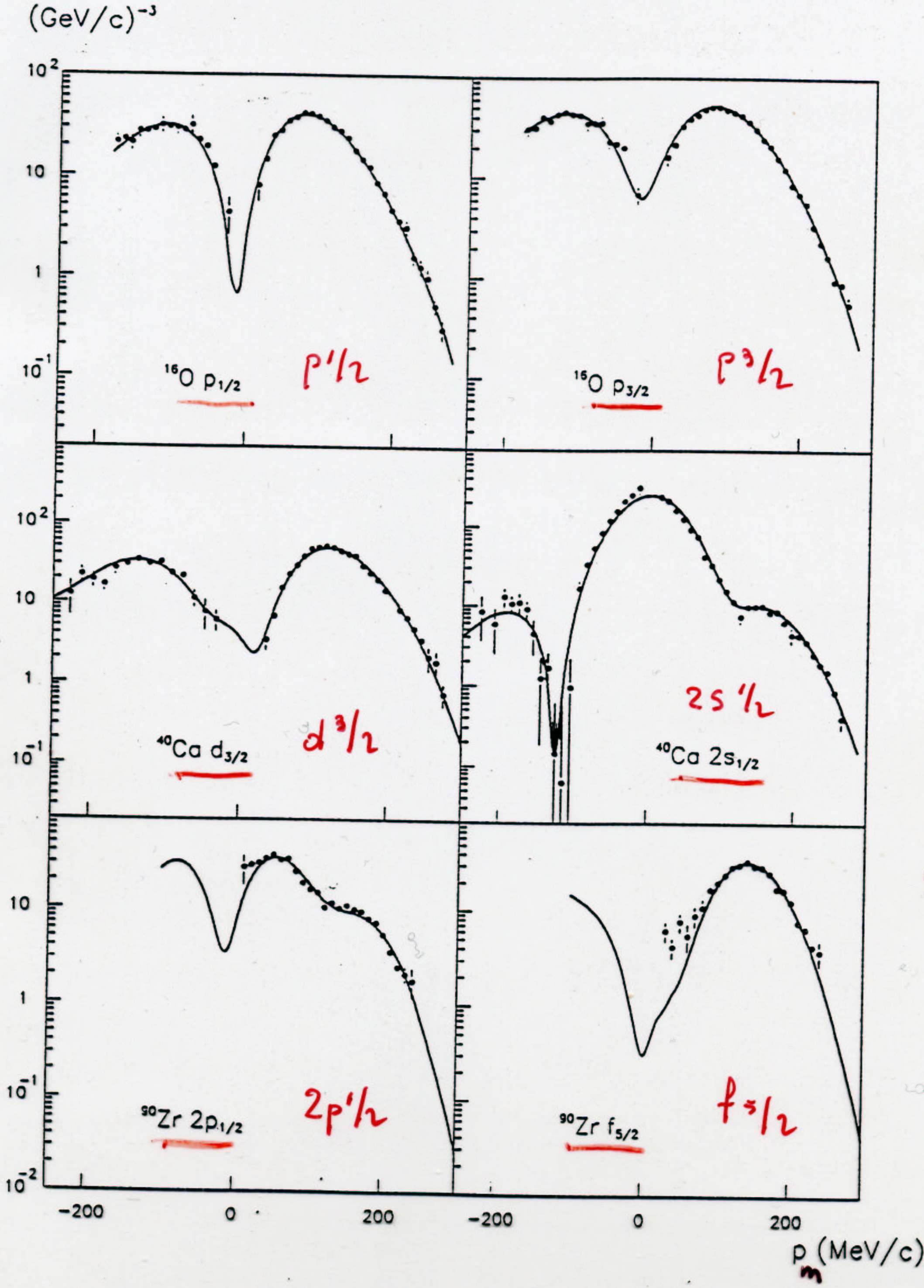
- $\chi^{(-)}$ eigenfunction of a phenomen. opt. pot.
- $\phi$ phenomen. s.p. b.s. wave function
- $S$ extracted in comparison with data

A reduction factor is applied to the calculated c.s. in order to reproduce the magnitude of the experimental c.s.
This factor is identified with $S$: experimental s.f.

- $S$ gives a measurement of correlation effects but since in these analyses it is extracted through a fit to the data it may include also the uncertainties and approximations of the theoretical model
- These analyses give a very good description of (e,e′p) data

(e, e'p)

REDUCED CROSS SECTION




$^{16}$O

$^{40}$Ca

$^{90}$Zr

DWIA CALCULATIONS - NIKHEF DATA

DWEEPY CODE   C. Giusti and F.D. Pacati  NPA 473 (1987) 717

electron and proton distortion   485 (1988) 461

- the spectroscopic strength found in (e,e′p) for the removal of protons from valence shells is $\sim 60 - 70\%$ of the value of IPSM $\Longrightarrow$ CORRELATIONS

- calculations of OVF and spectroscopic factors including all the correlations and able to reproduce data without the need to apply a reduction factors not available for complex nuclei

- Several studies are available where correlations are included

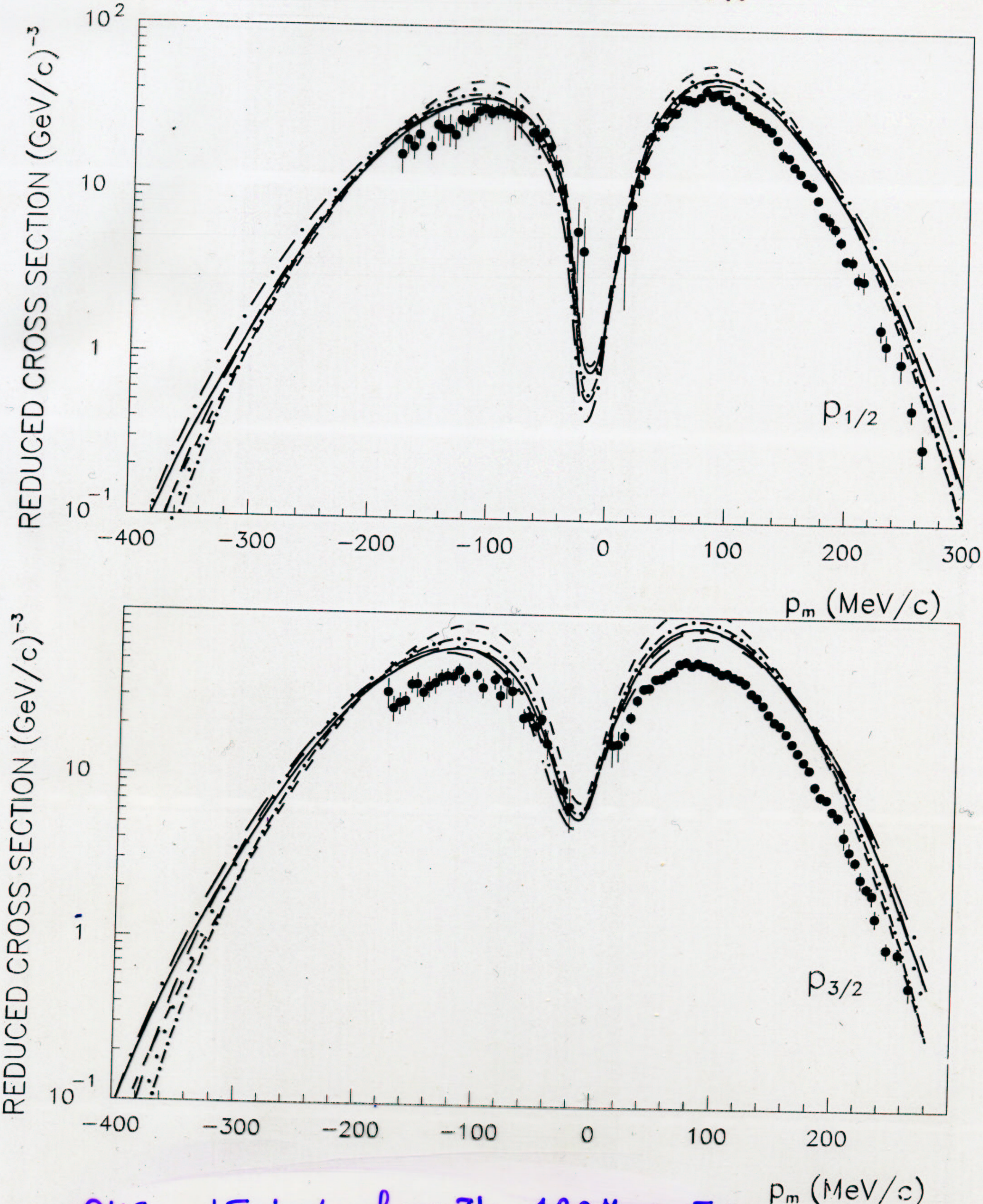
- Calculations of the spectral funcions

- DWIA calculations with OVF including correlations

OVF — GFM -·-·- JCM DWIA

--- GCM —·— CBF2

— — CBF1 ····· HFA




OVF obtained from the 1BDM within ≠ correlation methods

M. Gaidarov et al. PRC 014306 (199

OVF and s.f. from the OBDM within ≠ correlation methods:

| | | |
|---|---|---|
| GFM | Green's function method (A. Polls et al.) | SRC + TC |
| CBF1 | correlated basis function (D. Van Neck et al.) | SRC + TC |
| CBF2 | " " " (G. Co' et al.) | SRC |
| JCM | Jastrow correlation method (M. Stoitsov et al.) | SRC |
| GCM | Generator coordinator method (A. Antonov et al.) | collective corr. |
| HFA | Hartree Fock approximation | no correlations |

LRC are not included

procedure to extract OVF and s.f. on the base of the g.s. OBDM

(D. Van Neck, M. Waroquier and K. Heyde
PLB 314 (1993) 255)

Spectroscopic factors deduced from the calculations with * 1BDH

| | 1p1/2 | 1p3/2 |
|---|---|---|
| HF | 1 | 1 |
| GFM | 0.905 | 0.915 |
| GCM | 0.988 | 0.988 |
| CBF1 | 0.912 | 0.909 |
| CBF2 | 0.981 | 0.981 |
| JCM | 0.953 | 0.953 |
| exp. | 0.61 | 0.53 |

SRC

well

SR

SR

SR

Spectroscopic factors deduced from the calculations with + 1BDH
reduction factor

| | 1p1/2 | | Total | 1p3/2 | | Total | |
|---|---|---|---|---|---|---|---|
| HF | 1 | 0.75 | 0.75 | 1 | 0.55 | 0.55 | |
| GFM | 0.905 | 0.8 | 0.724 | 0.915 | 0.625 | 0.572 | SRC |
| GCM | 0.988 | 0.7 | 0.692 | 0.988 | 0.5 | 0.494 | well |
| CBF1 | 0.912 | 0.85 | 0.775 | 0.909 | 0.78 | 0.709 | SR |
| CBF2 | 0.981 | 0.9 | 0.883 | 0.981 | 0.6 | 0.589 | S |
| JCM | 0.953 | 0.825 | 0.783 | 0.953 | 0.6 | 0.572 | S |

exp. 0.61 0.53

Theor. 0.7~~7~~ 0.7~~6~~

exp : from the data analysis with a phenomenological b.s. w

red. fact : further s.f. accounting for correlations not included (LRC)

Theor : from W. Geurts et al. PRC 55 810 (1997) where both SRC and LRC are included

Theor 0.76 0.72

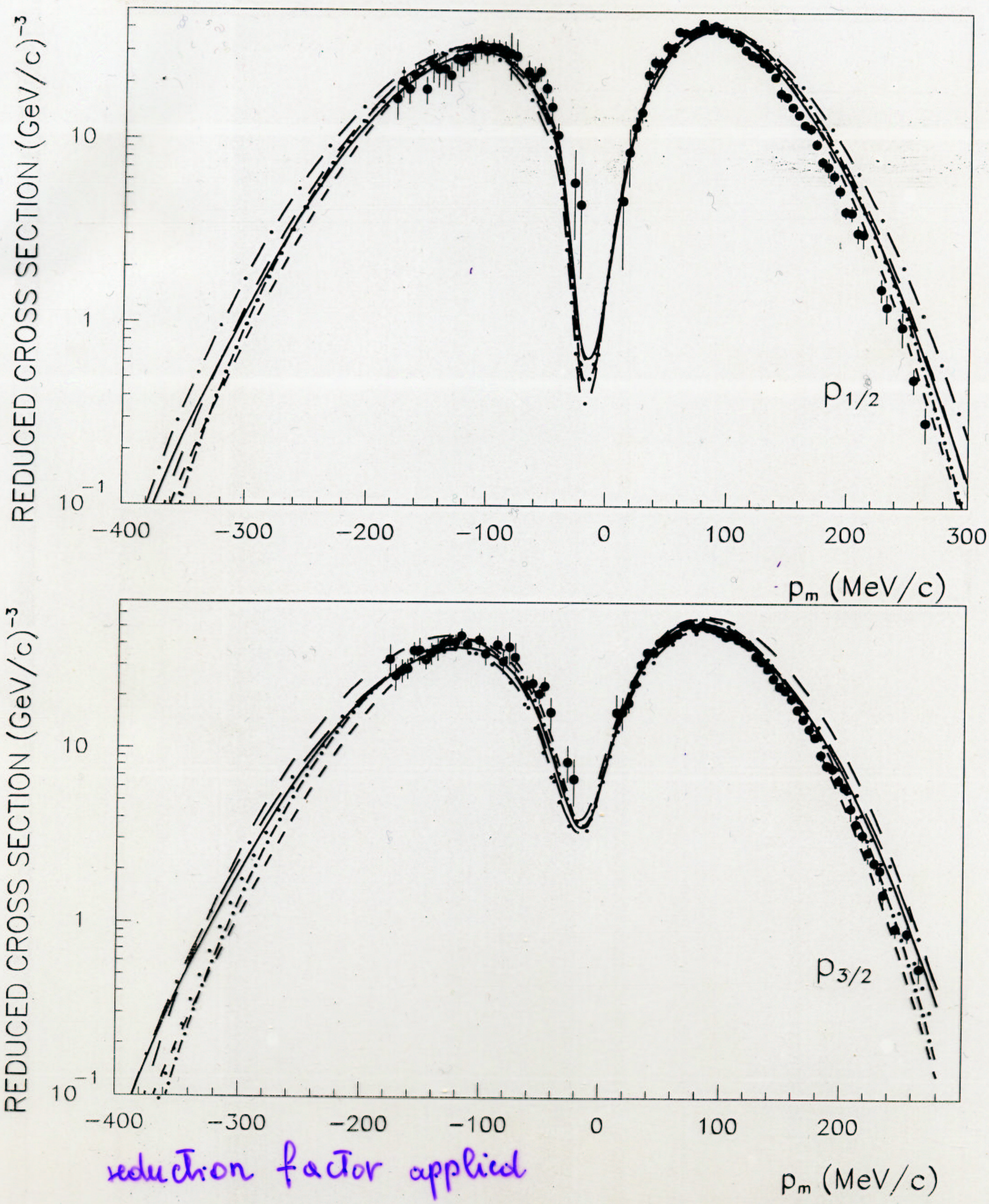
C. Barbieri and W. Dickhoff PRC 0 64313 (2002
Faddeev approach

$^{16}O(e,e'p)^{15}N$

OVF ● — GFM  -·-·· JCM  within ≠

--- GCM  —·— CBF2  correlation methods

— — CBF1  .... HFA

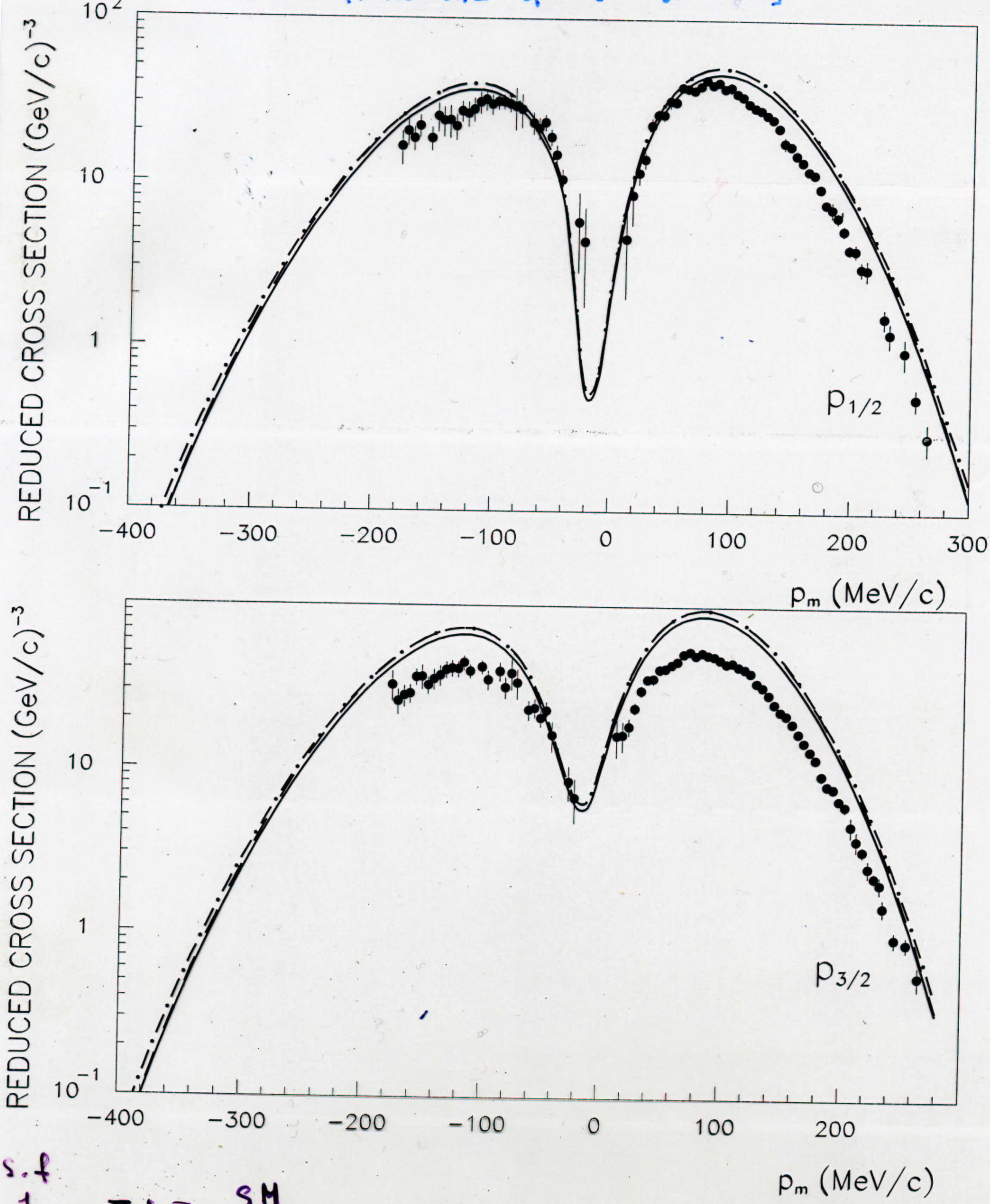



reduction factor applied

M. Gaidarov et al. PRC 014306 (1999)

DWIA - OVF from A. Fabrocini and G. Co' PRC 63 044319 (2001)

in the framework of the CBF theory.




s.f

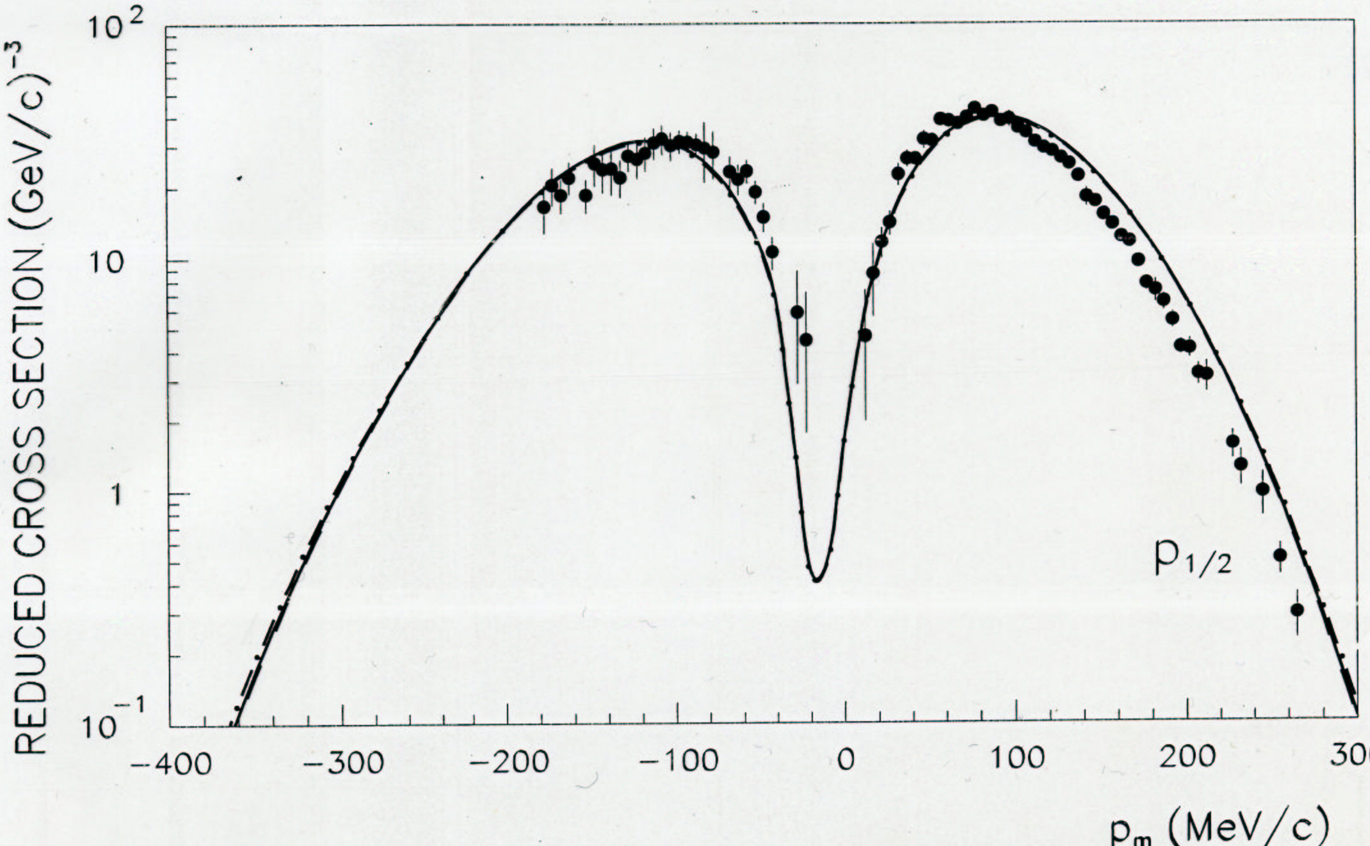
1 — · · — SM

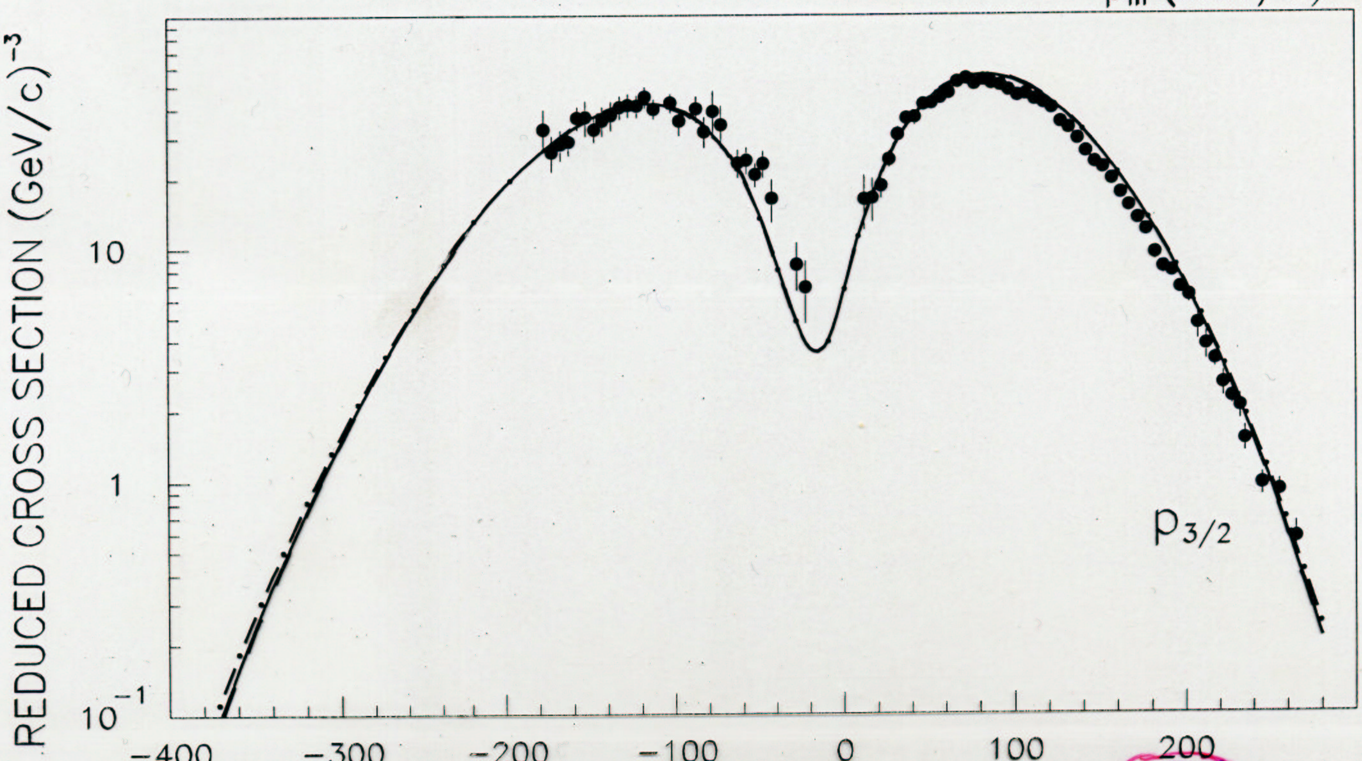
0.98 - - - Jastrow correlations

0.90 ——— " + spin-isospin + Tensor correlations

DWIA + OUR (2001)

with reduction factor




| | | s.f | red. factor | | Total | |
|---|---|---|---|---|---|---|
| — · — · · — | SM | 1 | 0.77 | 0.57 | 0.77 | 0.57 |
| — — — — | Jastrow | 0.98 | 0.786 | 0.58 | 0.77 | 0.57 |
| ——— | Jas + spin-isospin + TC | 0.9 | 0.86 | 0.63 | 0.77 | 0.57 |
| | | | p1/2 | p3/2 | p1/2 | p3/2 |

- consistency between different results gives further support to the interpretation of the s.f extracted in comparison with data

- These s.f. can be affected by other effects neglected or not adequately accounted for by the theoretical model

Various contributions have been studied in (e,e'p)

- MEC small effects in (e,e'p) cross sections
  (see e.g. C. G. and F. D. Pacati PRC 67 044601 (2003))

- CM-motion ~7 % enhancement of the s.f.
  (D. Van Neck et al. PRC 57 2308 (1997))

- relativistic DWIA reduction of the calculated cross sections

- Models based on a relativistic DWIA framework have been developed in recent years for (e,e'p)

RDWIA

relativistic ingredients $\begin{cases} \text{current operator} \\ \text{opt. pot} \\ \text{relativistic MFA} \end{cases}$

- RDWIA calculations are necessary for the analysis of (e,e'p) data at high energy

- It is important to study the relevance of relativistic effec also in the kinematics of the NIKHEF data that were analyzed with a nonrelativistic DWIA model

RDWIA $\longleftrightarrow$ DWIA

A. Meucci Ph.D. Thesis Pavia 2001

A. Meucci, C. G., F.D. Pacati PRC 64 014604 (200
PRC 64 064615 (2001
PRC 66 034610 (2002

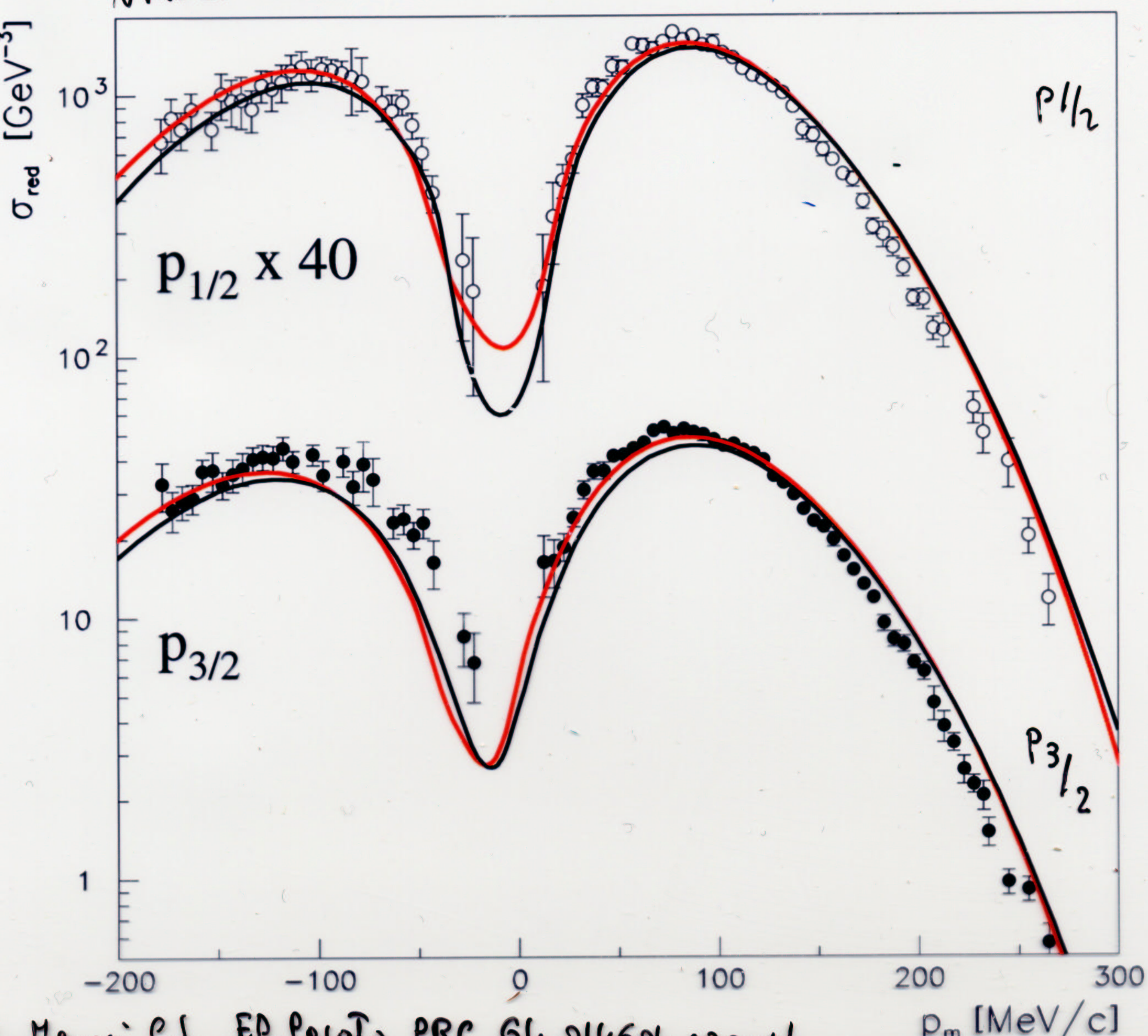
$^{16}O(e,e'p)$

DWIA: b.s. normalized upper component of the Dirac spinor; scatt. state Schrödinger equivalent opt. pot.

RDWIA

| reduction factor | $p_{1/2}$ | $p_{3/2}$ |
|---|---|---|
| DWIA | 0.64 | 0.54 |
| RDWIA | 0.71 | 0.60 |

NIKHEF data



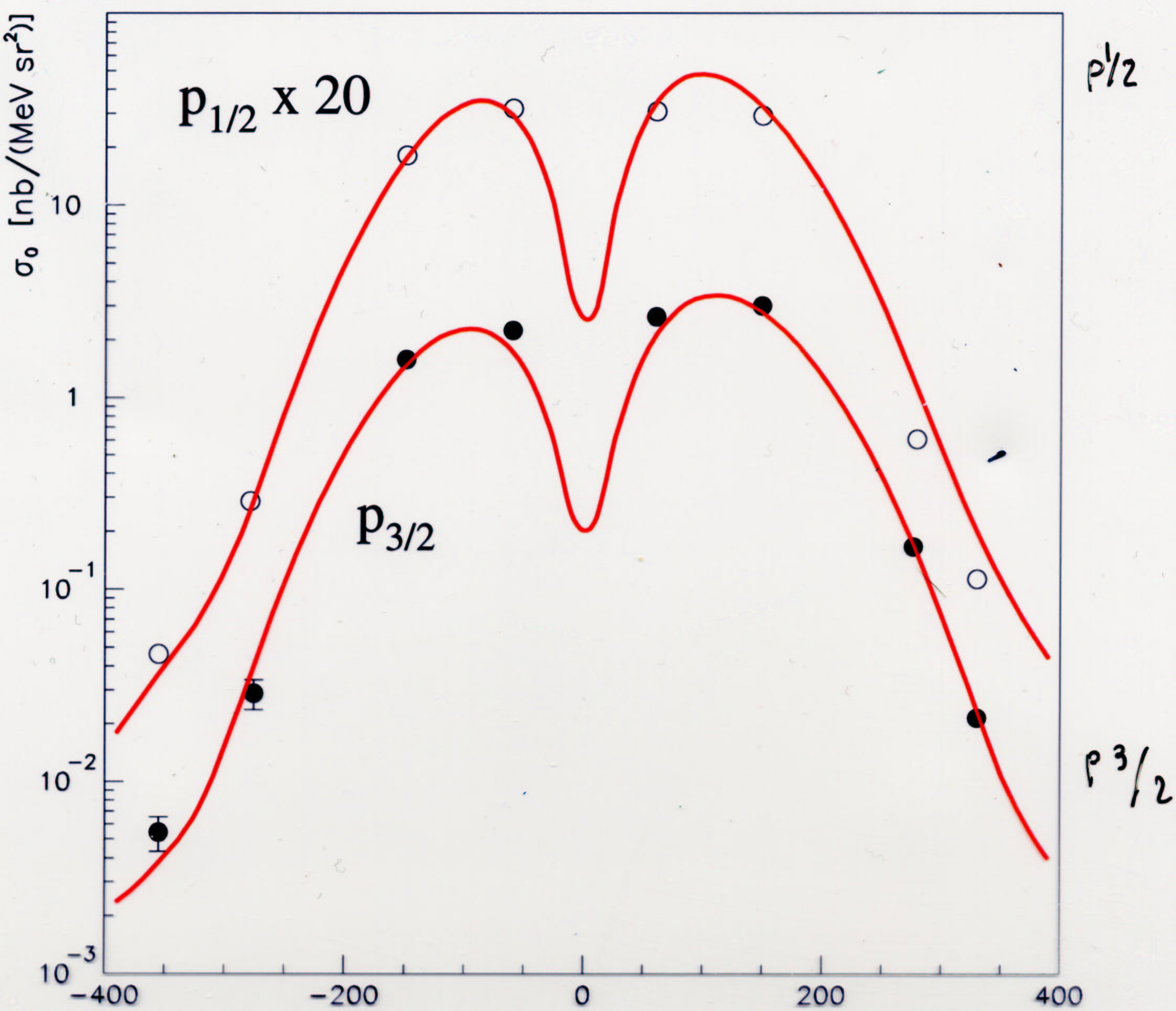

A. Meucci C.G., F.D. Pacati PRC 64 014604 (2001)

RDWIA

| | $p\,1/2$ | $p\,3/2$ |
|---|---|---|
| reduction factor | 0.71 | 0.60 |

{ The s.f. is The same as in The comparison with NIKHEF data }

JLab data




A. Meucci, C. G. F. D. Pacati PRC 64 014604 (2001)

- The spectroscopic factors account for the depletion of the quasihole states produced by NN-correlations.

- The depletion found in comparison with (e,e′p) data $\sim 30 - 40\%$.

- Calculations including correlations:

  - SRC a few %
  - SRC+TC 10% 15% (heavy nuclei)
  - LRC further depletion $\sim 20\%$

**!! AN UNAMBIGUOUS INDENTIFICATION OF SRC IN (e,e′p) VERY DIFFICULT! !!**

# SRC

- account for only a small part of the depletion of the q.h. states in (e,e′p)

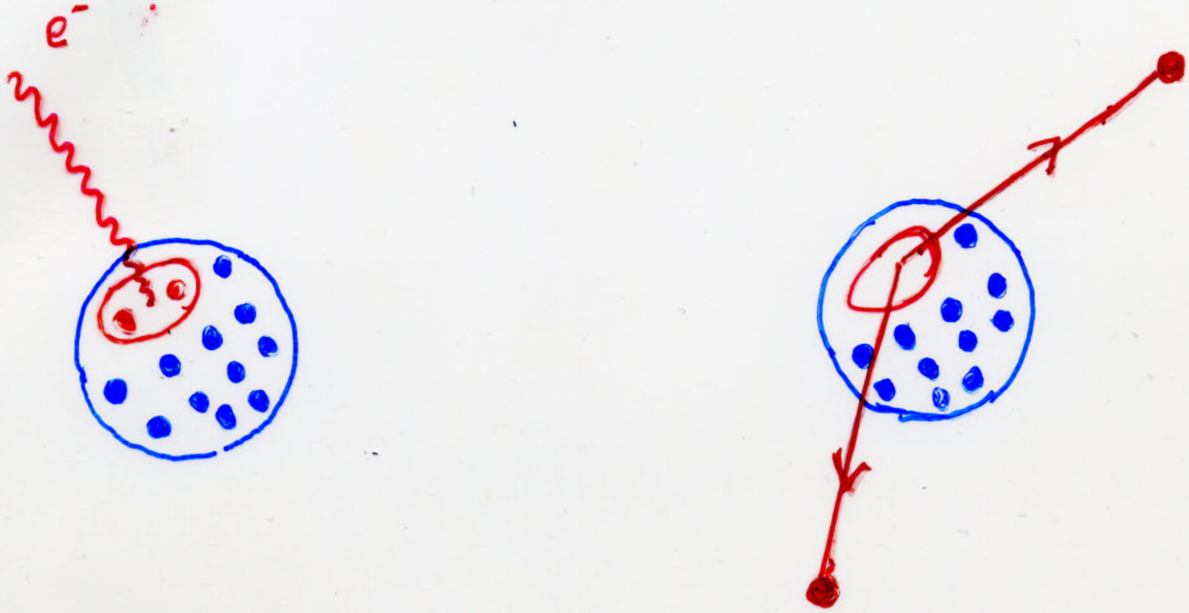
- high-momentum components in the nuclear wave function

- calculations of the momentum distribution indicate that the missing strength due to SRC is found at large values of $p_{\rm m}$ and $E_{\rm m}$, beyond the continuum threshold, where many processes are present and a clear cut indentification of SRC in (e,e′p) appears extremely difficult

- In exclusive (e,e′p) reactions one does not measure the whole momentum distribution but only the SF at a specific (low) $E_{\rm m}$

1NKO $\Rightarrow$ 2NKO

# TWO-NUCLEON KNOCKOUT

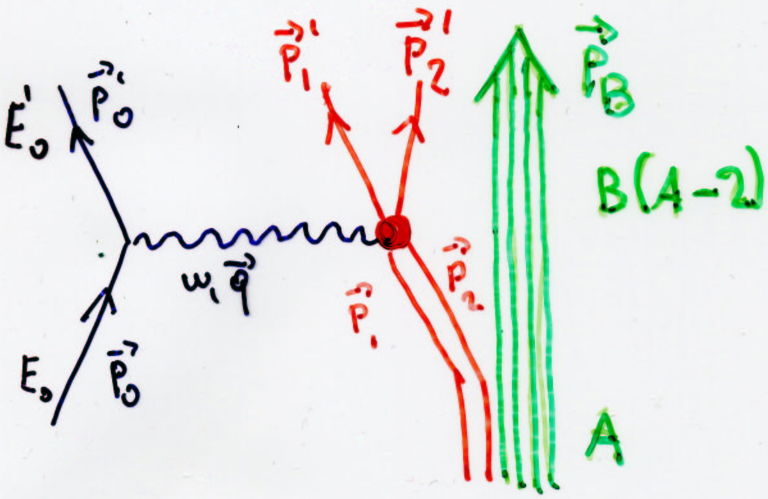



(e, e' NN)

- Low values of $E_x$

  validity of DKO mechanism

# TWO-NUCLEON KNOCKOUT $(e, e' NN)$




$|\Psi_f\rangle$

$q_\mu^2 = \omega^2 - \vec{q}^{\,2}$

$|\Psi_0\rangle$

$$E_m = \omega - \frac{\vec{p}_1^{\,\prime 2}}{2m} - \frac{\vec{p}_2^{\,\prime 2}}{2m} - \frac{\vec{p}_B^{\,2}}{2m(A-2)} = W_B^* - W_A$$ missing energy

$$\vec{p}_m = \vec{q} - \vec{p}_1^{\,\prime} - \vec{p}_2^{\,\prime} = -\vec{P} = -(\vec{p}_1 + \vec{p}_2) = \vec{p}_B$$ missing momentum

# TWO-HOLE SPECTRAL DENSITY FUNCTION

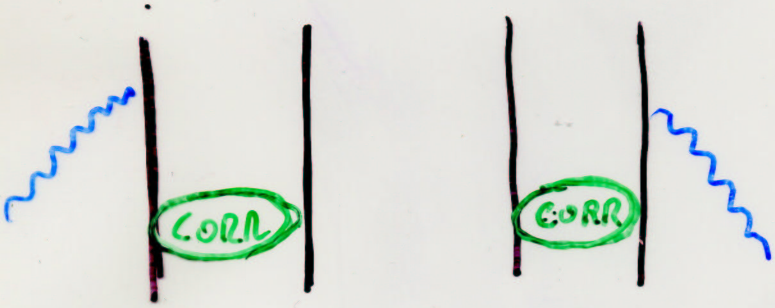
$$\boxed{S(\vec{p}_1\, \vec{p}_2\, \vec{\bar{p}}_1\, \vec{\bar{p}}_2, E_m)} = \langle \Psi_0 | a^\dagger_{\vec{\bar{p}}_2}\, a^\dagger_{\vec{\bar{p}}_1}\, \delta(E_m - H)\, a_{\vec{p}_1}\, a_{\vec{p}_2} | \Psi_0 \rangle$$

$$\int S(\vec{p}_1\, \vec{p}_2\, \vec{\bar{p}}_1\, \vec{\bar{p}}_2, E_m)\, dE_m = \boxed{\rho_2(\vec{p}_1 \vec{p}_2, \vec{\bar{p}}_1 \vec{\bar{p}}_2)}$$ TWO-BODY DENSIT

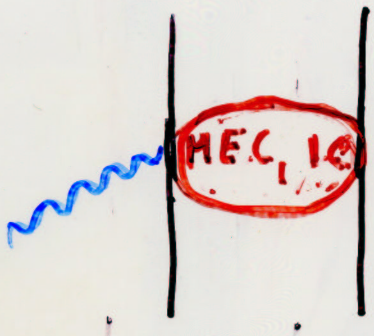
$$\boxed{\vec{p}_1 = \vec{\bar{p}}_1 \quad \vec{p}_2 = \vec{\bar{p}}_2} \Longrightarrow \rho_2(\vec{p}_1 \vec{p}_2, \vec{p}_1 \vec{p}_2) \Rightarrow \rho_2(\vec{r}_1 \vec{r}_2, \vec{r}_1 \vec{r}_2) = \boxed{\rho(\vec{r}_1 \vec{r}_2)}$$

# PAIR CORRELATION FUNCTION

$$\rho(\vec{r}_1 \vec{r}_2) = \int |\Psi_0(\vec{r}_1 \vec{r}_2 \vec{r}_3 \ldots \vec{r}_A)|^2\, d\vec{r}_3 \ldots d\vec{r}_A$$




- 1-body currents  NN- correlations SRC

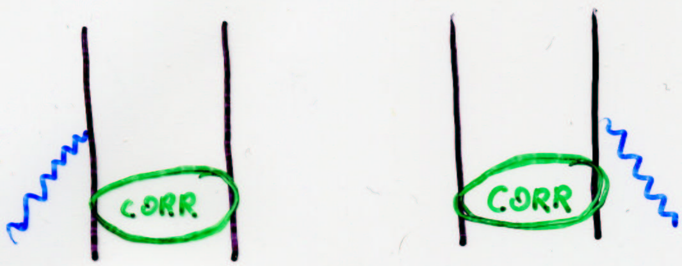



- 2-body currents

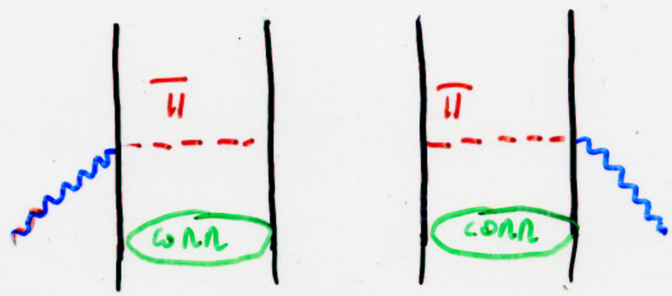
TWO COMPETING PROCESSES

# NUCLEAR CURRENT

$$J^{\mu} = J^{(1)\mu} + J^{(2)\mu}$$

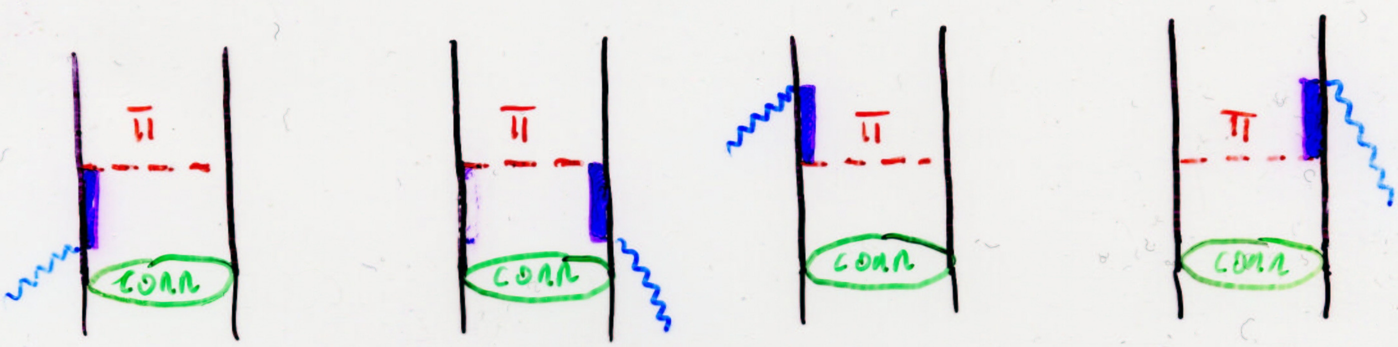



- 1-body current




only for pn-knockout

PION-IN-FLIGHT SEAGULL




INTERMEDIATE Δ-ISOBAR EXCITATION

- 2-body current

TWO COMPETING PROCESSES

- pp - KO  2-body currents less important
  preferable to study SRC

- pn - KO  correlations stronger TC
  but 2-body currents more important
  preferable to study TC

- EXCLUSIVE REACTIONS $^{16}O(e,e'pp)^{14}C$  $^{16}O(e,e'pn$

- exclusive reactions  different final states may act as a filter to disentangle and stud[y] different reaction processes

- $^{16}O$  suitable target due to the presence [of] discrete final states well separated in energy and that can be separated [in] experiments with good resolution

$$J^{\mu}(\vec{q}) = \int e^{i\vec{q}\cdot\vec{r}} \langle \Psi_f | \hat{J}^{\mu}(\vec{r}) | \Psi_0 \rangle \, d\vec{r}$$

- EXCLUSIVE REACTION
- DKO MECHANISM

$$J^{\mu}(\vec{q}) = \int e^{i\vec{q}\cdot\vec{r}} \chi^{(-)*}(\vec{r}_1\vec{r}_2) \, J^{\mu}(\vec{r}_1\vec{r}_2, \vec{r}) \, \phi(\vec{r}_1\vec{r}_2) \, d\vec{r} \, d\vec{r}_1 \, d\vec{r}_2$$

- $\chi^{(-)} = \langle \Phi_B \vec{r}_1 \vec{r}_2 | \Psi_f \rangle$ FINAL STATE $\mathcal{H}^{+}(\omega + E_m)$

  TWO-NUCLEON SCATTERING WAVE FUNCTIO[N]

- $J^{\mu} = J^{1-b} + J^{2-b}$

- $\phi = \langle \phi_B \vec{r}_1 \vec{r}_2 | \Psi_0 \rangle$ INITIAL STATE $\mathcal{H}(-E_m)$

  TWO-NUCLEON OVERLAP FUNCTIO[N]

C. Giusti and F. D. Pacati Nucl. Phys. A 535 (1991) 57[3]

# FINAL STATE

$$\chi^{(-)} = \langle \Phi_B \vec{r}_1 \vec{r}_2 | \Psi_f \rangle$$

$$V = \underbrace{V_{1B} + V_{2B}} + V_{12}$$

- $V_{1B}$
- $V_{2B}$

Phenomenological optical potential

→ $V_{12}$ neglected

$$\chi^{(-)}(\vec{r}_1, \vec{r}_2) = \chi^{(-)}_{\vec{p}_1'}(\vec{r}_1)\, \chi^{(-)}_{\vec{p}_2'}(\vec{r}_2)$$

$V_{12}$ perturbative treatment

M. Schwamb, S. Boffi, C. G. F. D. Pacati

EPJA 17 7 (2003)

EPJA 19 (2004)

# INITIAL STATE

## TWO-NUCLEON OVERLAP

- PP- KO $\langle {}^{14}C(J^\pi)\, \vec{r}_1 \vec{r}_2 \mid {}^{16}O_{g.s.} \rangle$

W. Geurts, K. Allaart, H. Müther, W. Dickhoff
PRC 54 (1996) 1144

C.G. F.D. Pacati, K. Allaart, W. Geurts, W. Dickhoff, H. Müth
PRC 57 (1998) 1691

- Pn - KO $\langle {}^{14}N(J^\pi)\, \vec{r}_1 \vec{r}_2 \mid {}^{16}O_{g.s.} \rangle$

C.G. H. Müther, F.D. Pacati, M. Stauf
PRC 60 (1999) 054608

- PP- KO $\langle {}^{14}C(J^\pi)\, \vec{r}_1 \vec{r}_2 \mid {}^{16}O_{g.s.} \rangle$
  Pn- KO $\langle {}^{14}N(J^\pi)\, \vec{r}_1 \vec{r}_2 \mid {}^{16}O_{g.s.} \rangle$

C. Barbieri, W. Dickhoff PRC 65 06431
(2002

C. Barbieri, W. Dickhoff, C.G., F.D. Pacati

nucl-Th/0402081

# • INITIAL STATE

## TWO-NUCLEON OVERLAP

• PP-KO $\langle {}^{14}C\,((J^{\pi})\,\vec{r}_1\,\vec{r}_2\,|\,{}^{16}O_{g.s.}\rangle$

W. Geurts, K. Allaart, H. Müther, W. Dickhoff
PRC 54 (1996) 1144

e.g. F.D. Pacati, K. Allaart, W. Geurts, H. Müther, W. Dickhoff
PRC 57 (1998) 1691

• LRC and SRC are calculated in a separated but consistent way

• The Hilbert space is split into two parts

• LRC are evaluated solving hh - DRPA inside a model space large enough to account for the collective features that influence the pair removal amplitudes

• SRC decoupled from the collective motion at low energy
defect functions from a BG equation where the Pauli operator considers configurations outside the model space where LRC are evaluated

• same G - matrix for defect functions and RPA

# INITIAL STATE

TWO-NUCLEON OVERLAP

pn-KO $\langle {}^{14}N(J^\pi)\, \vec{r}_1 \vec{r}_2 \,|\, {}^{16}O_{g.s.} \rangle$

e.g., H. Müther, F.D. Pacati, M. Stauf

PRC 60 (1999) 054608

- coupled-cluster method
- defect functions depend also on the c.m. quantum numbers
- removal amplitudes consider only KO of nucleons from 1p-shell

# • INITIAL STATE

## TWO - NUCLEON OVERLAP

• PP - KO $\langle {}^{14}C(J^{\pi})\, \vec{r}_1 \vec{r}_2 \,|\, {}^{16}O_{g.s} \rangle$

PN - KO $\langle {}^{14}N(J^{\pi})\, \vec{r}_1 \vec{r}_2 \,|\, {}^{16}O_{g.s.} \rangle$

C. Barbieri, W. Dickhoff
PRC 65 064313 (2002)

C. Barbieri, W. Dickhoff, C.G., F.D. Pacati (2004)
nucl-Th/0402081

• effects of nuclear fragmentation have been obtained in a self consistent way

• LRC hh - DRPA in a large SM basis

• SRC + TC defect functions. The projection out of the space where LRC are calculated is computed exactly

• consistent calculation of PP and PN - KO kin MAMI

superII $\gamma_1 = 0°$ $\gamma_2 = 180°$

$E_0 = 855$ MeV $\omega = 215$ MeV

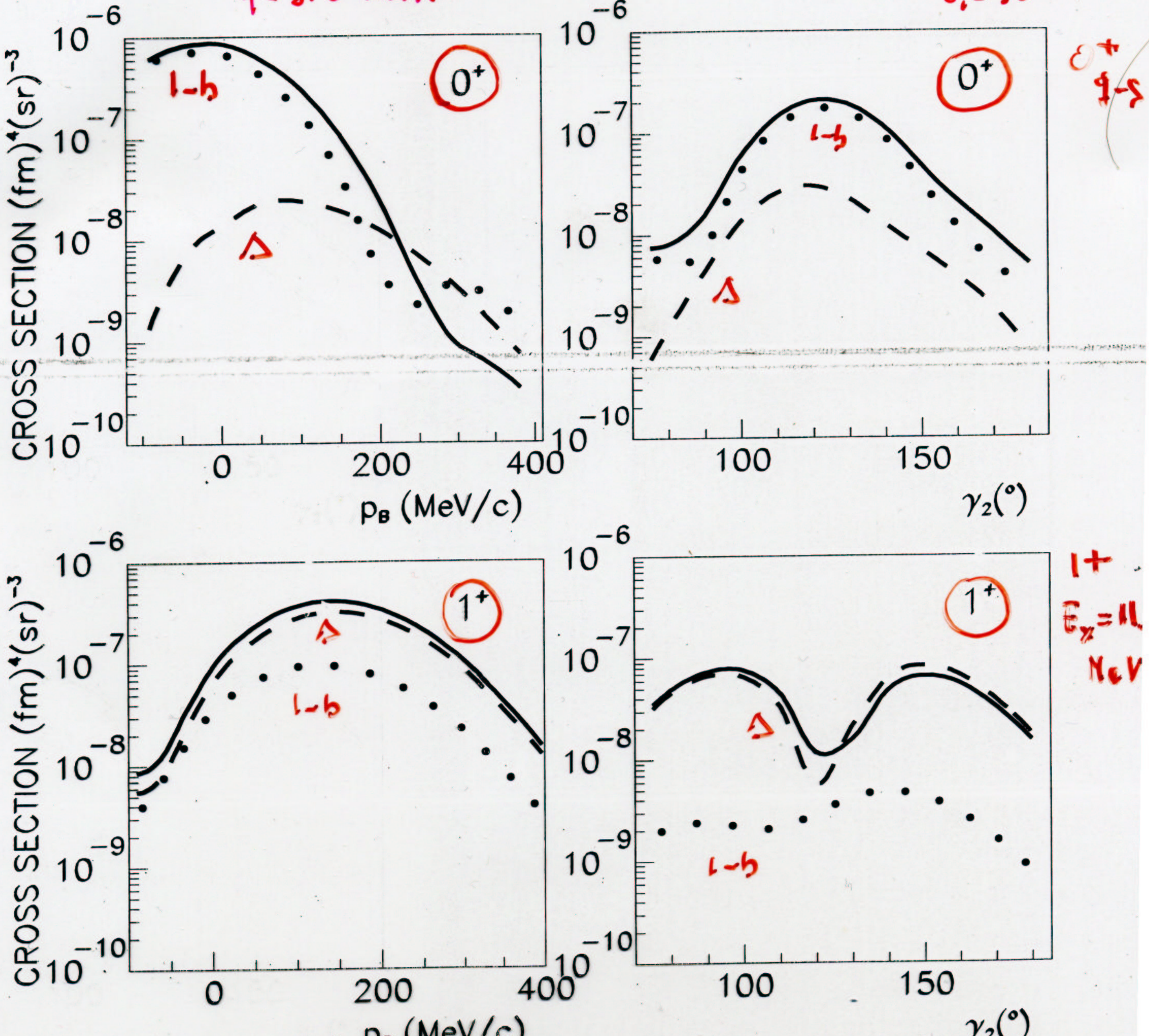
$q = 316$ MeV/c

KIN NIKHEF

$E_0 = 584$ MeV $\omega = 210$ MeV

$q = 300$ MeV/c $T_1' = 137$ MeV

$\gamma_1 = 30°$




—— 1+2 - body current

• • • 1-body current

– – – Δ - current

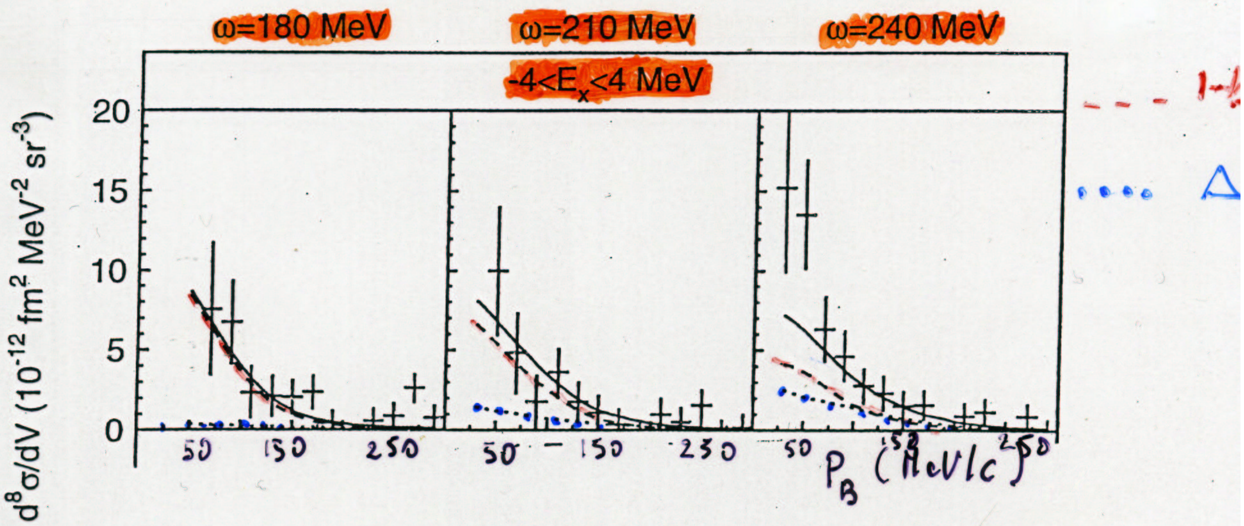
defect functions Bonn-A

OVF : C.G., F.D. Pacati, K. Allaart, W. Geurts, W. Dickhoff, H. Müther

PRC 57 (1998) 1691

$^{16}O(e,e'pp)^{14}C$

$0^+_{g.s.}$




NIKHEF DATA

R. Starink Ph. D Thesis

Amsterdam 1999

R. Starink et al. PLB 474 (2000) 33

EVIDENCE FOR SRC!

$^{16}O(e,e'pp)^{14}C$

KIN NIKHEF

$E_0 = 584$ MeV $\omega = 210$ MeV

$q = 300$ MeV/c $T'_1 = 137$ MeV

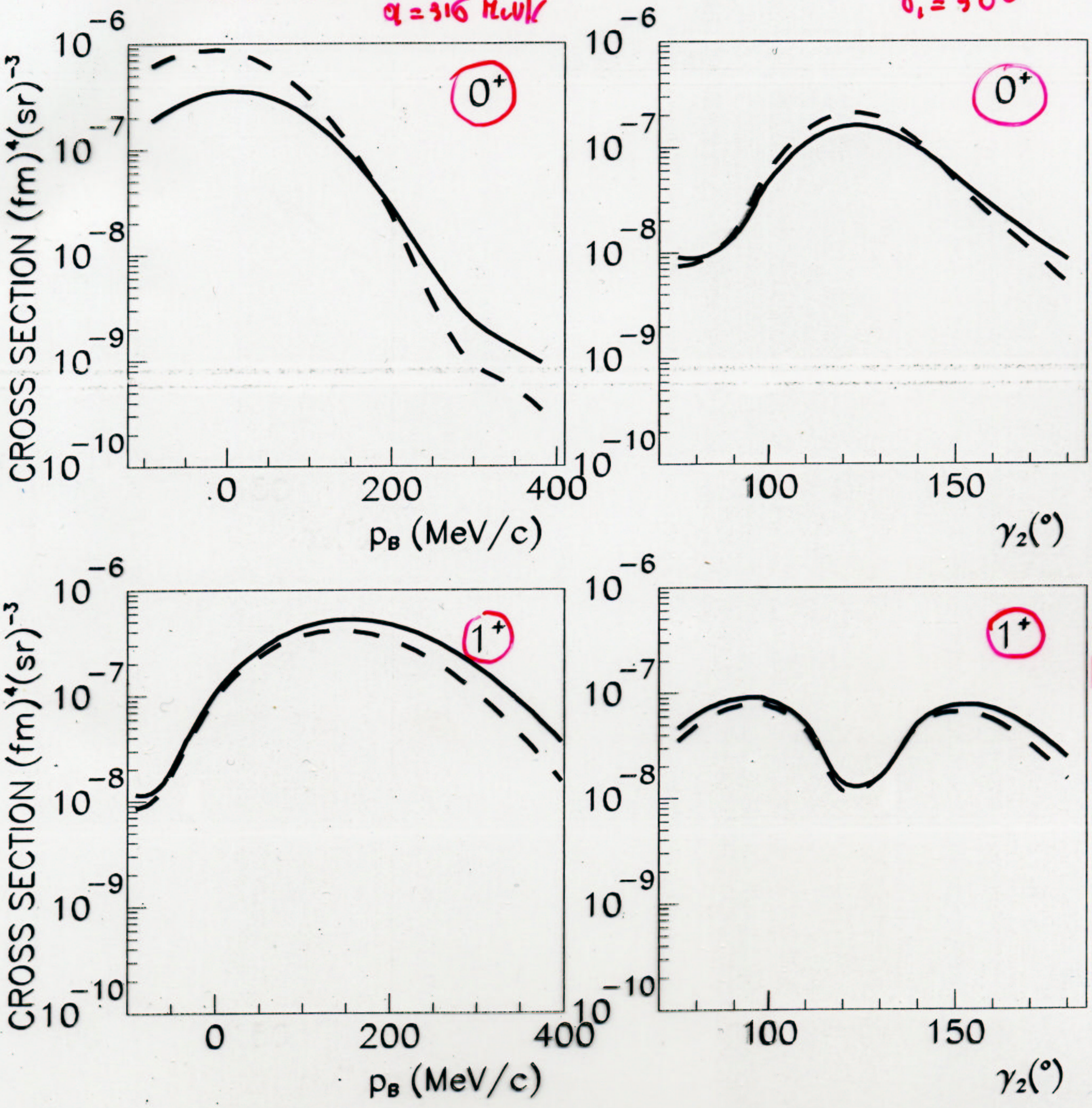
$\gamma_1 = 30°$

KIN MAMI

superII $\gamma_1 = 0°$ $\gamma_2 = 180°$

$E_0 = 855$ MeV $\omega = 215$ MeV

$q = 316$ MeV/c




$0^+$

$1^+$

$E_x =$

——— C. Barbieri, W.H. Dickhoff, C.G. F.D. Pacati 200

nucl-th/0402081

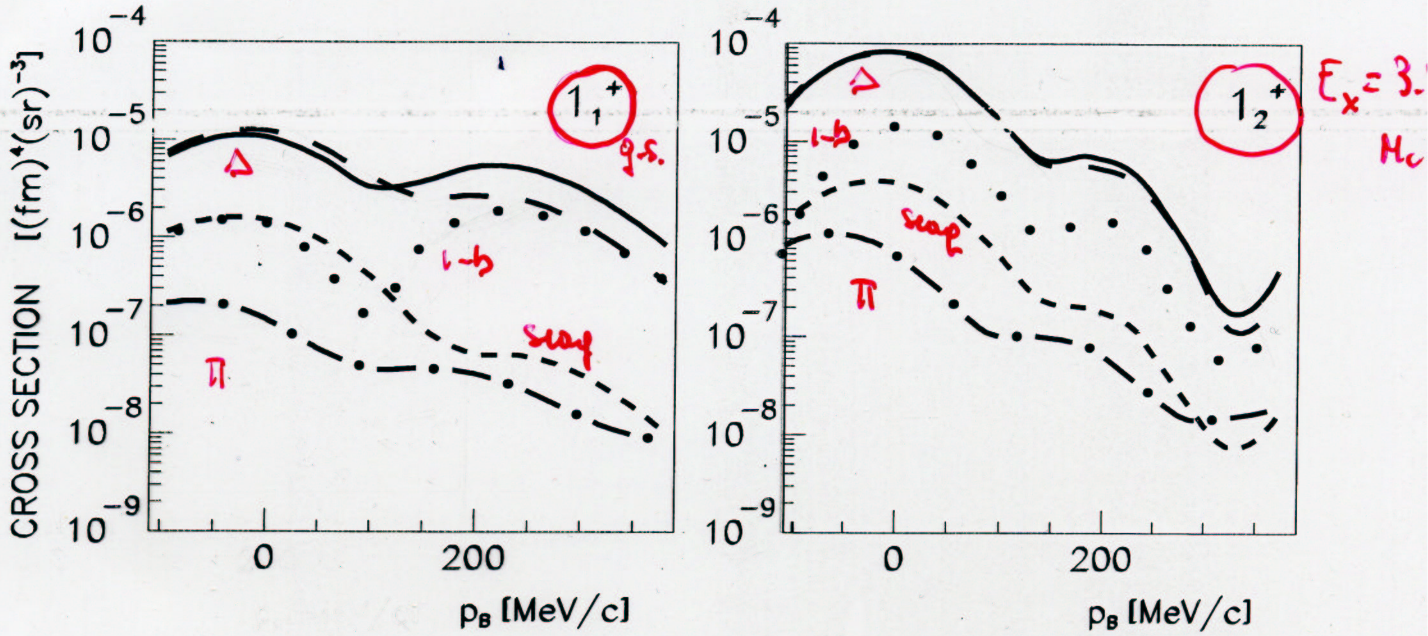
– – – C.G., F.D. Pacati, K. Allaart, W. Geurts, W.H. Dickoff, H. M

PRC 57 (1998) 1691

$^{16}O(e,e'pn)\,^{14}N$

super ll $\gamma_1 = 0^\circ$ $\gamma_2 = 180^\circ$

$E_0 = 855$ MeV $\omega = 215$ $q = 316$ MeV/c




—— Total

• • • • 1-body

- - - - seagull

-·-·- $\pi$-in-flight

— — — $\Delta$

defect functions Bonn-C

OUF : C. Barbieri, W.H. Dickhoff, C.G., F.D. Pacati

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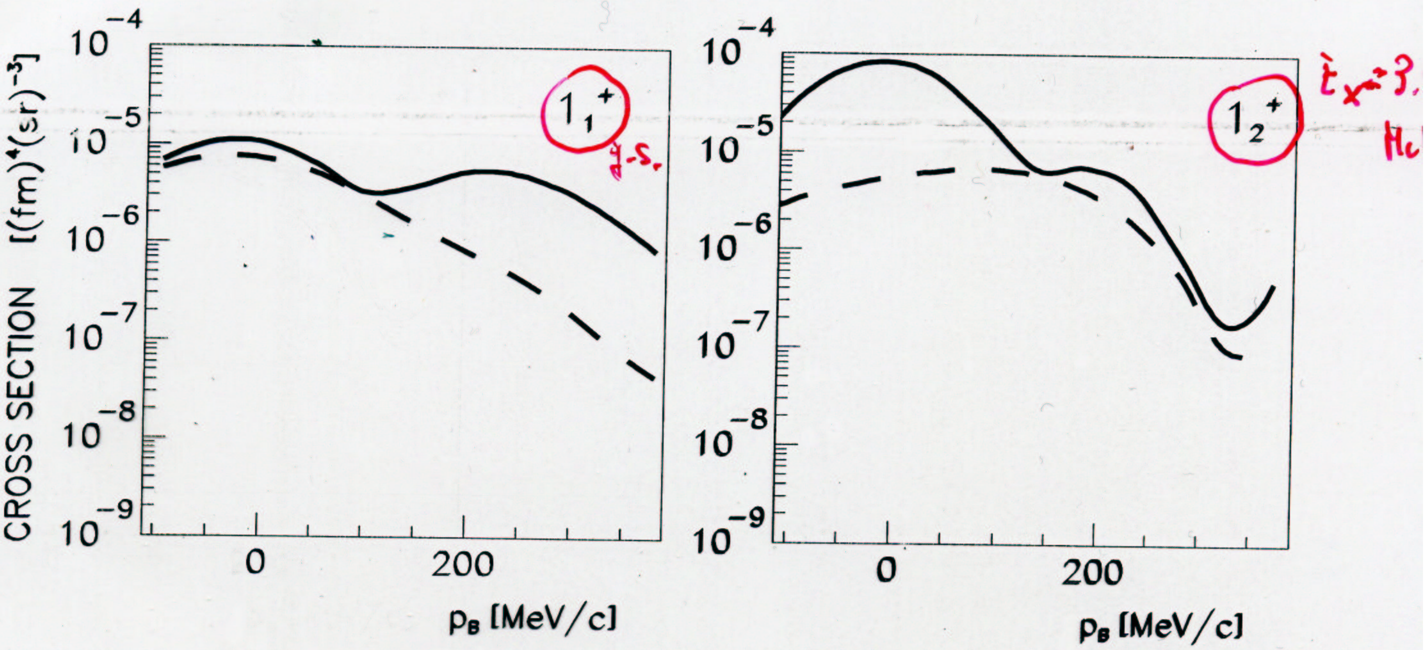
$^{16}O(e,e'pn)^{14}N$

super || $\gamma_1 = 0^\circ$ $\gamma_2 = 180^\circ$

$E_0 = 855$ MeV $\omega = 215$ $q = 316$ MeV/c




C. Barbieri, W.H. Dickhoff, C.G., F.D. Pacati (2004)
nucl-th 0402081

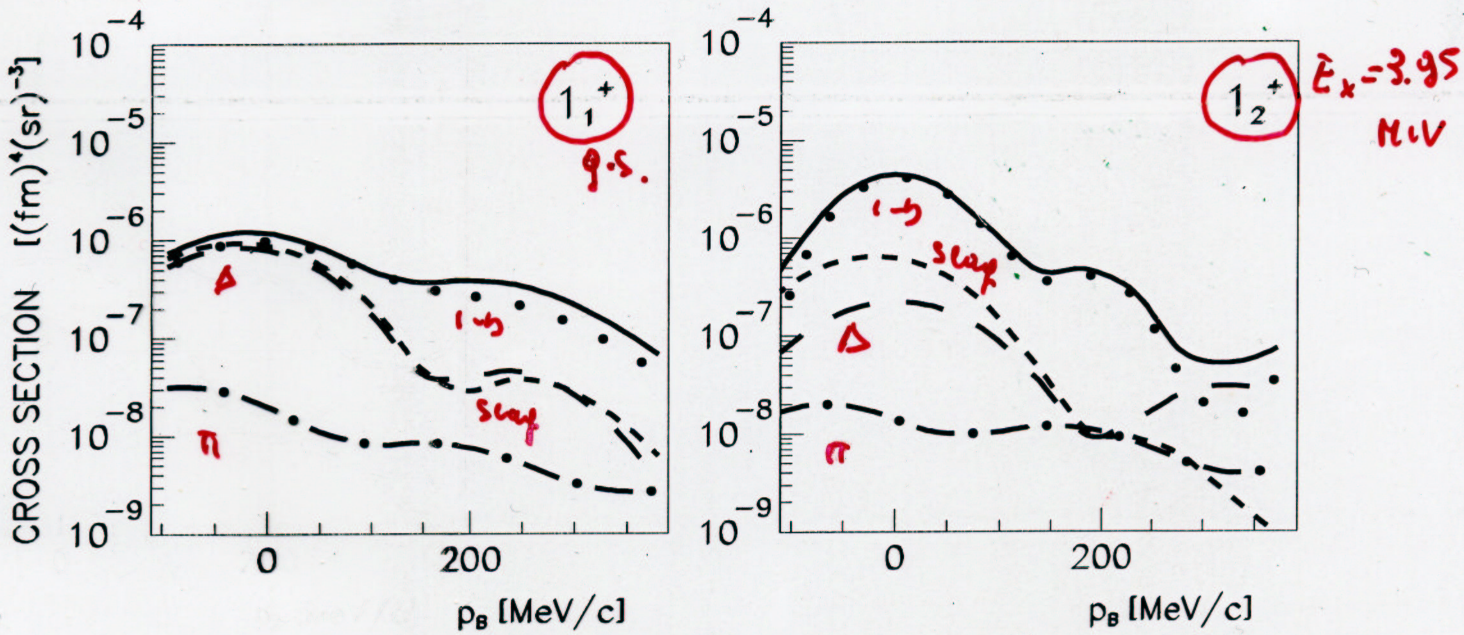
C.G., H. Müther, F.D. Pacati, M. Stauf, PRC 60 (1999
0546608

$^{16}O(e,e'pn)^{14}N$

super || $\gamma_1 = 0$ $\gamma_2 = 180°$

$E_0 = 855$ MeV $\omega = 215$ $q = 316$ MeV/c

# DEFECT FUNCTIONS DUE TO TENSOR CORRELATIONS SWITCHED OFF




Total
1-b
π
seagull
Δ

C. Barbieri, W.H. Dickhoff, C. Giusti, F.D. Pacati.
nucl-Th/0402081

| | | |
|---|---|---|
| F.D. PACATI | Univ. Pavia | RDWIA |
| A. MEUCCI | | |
| A.N. ANTONOV | INRNE Sofia | ONOUF |
| M.K. GAIDAROV | | |
| G. CO' | Univ. Lecce | |
| A. FABROCINI | Univ. Pisa | |
| K. ALLAART | Vrije Univ. Amsterdam | TNOUF |
| W. GEURTS | | |
| W.H. DICKHOFF | Washington Univ. St. Louis | |
| H. MÜTHER | Univ. Tuebingen | |
| M. STAUF | | |
| C. BARBIERI | TRIUMF Vancouver | |