

TABLE OF CONTENTS

	<u>PAGE</u>	<u>POSTER NO.</u>
<b>I</b> <u>INTERMEDIATE ENERGY BOTH THEORETICAL AND EXPERIMENTAL</u>		
REAL-TO-IMAGINARY RATIO FOR $\bar{p}p$ FORWARD AMPLITUDE NEAR $\bar{n}n$ THRESHOLD		
O.D.Dalkarov and K.V.Protasov .....	4	
$\bar{p}p$ SCATTERING PARAMETERS WITH A MODIFIED EFFECTIVE RANGE EXPANSION		
A.V.Lagu and A.K.Singh .....	6	
MODEL DEPENDENCE OF $\bar{N}$ -N POLARIZATION OBSERVABLES		
W.Schweiger and W.Plessas .....	8	[ I - 1 ]
THE REAL-TO-IMAGINARY RATIO OF THE FORWARD $\bar{p}p$ SCATTERING AMPLITUDE		
T.Ueda .....	10	[ I - 2 ]
SEARCH FOR MONOCHROMATIC PHOTON EMISSION FROM $\bar{p}p$ ANNIHILATION AT REST		
M.Chiba, K.Doi, T.Fujitani, J.Iwahori, M.Kawaguti, M.Kobayashi, M.Koike, T.Kozuki, S.Kurokawa, H.Kusumoto, H.Nagano, Y.Nagashima, T.Omori, S.Sugimoto, M.Takasaki, F.Takeuchi, M.Tsuchiya, M.Ueda, Y.Yamaguchi and H.Yoshida .....	12	[ I - 3 ]
THE INFLUENCE OF RELATIVISTIC EFFECTS ON THE LEVEL WIDTHS OF BARYONIUM		
V.A.Karmanov and I.S.Shapiro .....	14	
$\xi(2,2)$ IS A $\Lambda\bar{\Lambda}$ BOUND STATE		
S.Ono .....	16	
ROLE OF KAON EXCHANGE IN THE $p\bar{p} \rightarrow \Lambda\bar{\Lambda}$ REACTION		
M.Kohno and W.Weise .....	18	[ I - 4 ]

THE  $p\bar{p} \rightarrow \Sigma^0 \bar{\Lambda} + \Lambda \bar{\Sigma}^0$  REACTION AND THE EFFECTIVE  
QUARK-GLUON DYNAMICS

M.Kohno and W.Weise ..... 20 [ I - 5]

ANTIPROTON-NUCLEUS SCATTERING AT LOW AND INTERMEDIATE  
ENERGIES

O.D.Dalkarov, V.A.Karmanov and A.V.Trukhov ..... 22

SEARCH FOR DIBARYONS IN THE BACKWARD PION-DEUTERON  
ELASTIC SCATTERING AT 1.75 - 3.1 GeV/c

B.M.Abramov, I.A.Dukhovskoy, V.V.Kishkurno,  
L.A.Kondratyuk, A.P.Krutenkova, V.V.Kulikov,  
M.A.Matsyuk, P.A.Murat, I.A.Radkevich,  
U.V.Ralchenko, E.N.Turdakina, V.S.Fedoretz  
and L.S.Bagdasaryan ..... 24

DESCRIPTION OF POLARIZATION EFFECTS IN THE INITIAL  
STATE OF  $\gamma d \rightarrow pn$  AND DIBARYON RESONANCES

V.P.Barannik and Yu.V.Kulish ..... 26

ANALYZING POWERS IN THE REACTION  $p(n, \gamma)d$  AT MEDIUM  
ENERGIES

M.Hugi, R.Abegg, M.Ahmad, J.M.Cameron, J.Collot,  
N.E.Davison, G.W.Edwards, H.Fielding, G.Gaillard,  
D.A.Hutcheon, P.Kitching, C.A.Miller, N.Stevenson,  
I.J.van Heerden and J.S.Wesick ..... 28 [ I - 6]

THE  $\pi NN$ - $NN$  SYSTEM AT INTERMEDIATE ENERGY: EFFECT  
OF HEAVY MESON EXCHANGES

G.H.Lamot, C.Fayard and T.Mizutani ..... 30 [ I - 7]

THE  $\pi NN$ - $NN$  SYSTEM AT INTERMEDIATE ENERGY: EFFECT  
OF THE S AND P N-N PARTIAL WAVES

G.H.Lamot, C.Fayard, T.Mizutani and B.Saghai ..... 32 [ I - 8]

N-N SCATTERING,  $pp \rightarrow pn\pi^+$  AND  $pp \rightarrow d\pi^+$  IN THE  $\pi NN$   
DYNAMICS

T.Ueda ..... 34 [ I - 9]

THE EFFECT OF THE  $\pi d$  CHANNEL COUPLING ON THE MEDIUM  
ENERGY  $NN$  INTERACTION

T.Mizutani, B.Saghai, C.Fayard and G.-H.Lamot ..... 36 [ I - 10]

AMPLITUDE ANALYSIS OF THE  $pp \rightarrow \pi^+d$  REACTION

G.H.Lamot, C.Fayard and T.Mizutani .....	38	[ I -11]
TWO-NUCLEON FORCE MODEL WITH $\Delta$ -ISOBAR AND PION DEGREES OF FREEDOM		
H.Poepping, P.U.Sauer and Xi-Zhen Zhang .....	40	
A PHASE SHIFT ANALYSIS OF PROTON-PROTON SCATTERING IN $P_L=1.0-2.2$ GeV/C REGION AND DIPROTON RESONANCES		
H.Kanada and K.Sakai .....	42	
IMPROVED $\Delta$ -ISOBAR MODEL AND "DIBARON RESONANCES"		
H.Tanabe and K.Ohta .....	44	
UNITARY MESON-EXCHANGE CALCULATION ON $NN \rightarrow NN\pi$ REACTION		
A.Matsuyama and T.-S.H.Lee .....	46	[ I -12]
$p + p \rightarrow d + \pi^+$ TOTAL CROSS-SECTIONS FROM 350 TO 500 MeV		
G.L.Giles, E.G.Auld, G.Jones, G.J.Lolos, B.J.McParland, W.Ziegler, D.Ottewell, P.L.Walden and W.R.Falk .....	48	[ I -13]
STUDY OF THE $np \rightarrow pp\pi^-$ REACTION IN THE INCIDENT NEUTRON MOMENTUM RANGE OF 1.0 - 1.9 GeV/C		
T.Tsuboyama, N.Katayama, F.Sai and S.S.Yamamoto ....	50	
SPIN OBSERVABLES OF $np \rightarrow d\gamma$ IN THE COLLINEAR GEOMETRY		
D.A.Hutcheon .....	52	
DETERMINATION OF $p$ - $p$ SCATTERING AMPLITUDES AT 6 GeV/C AND ITS IMPLICATIO TO SOFT HADRON PHYSICS		
M.Matsuda, H.Suemitsu and M.Yonezawa .....	54	
INCLUSIVE ELECTRODISINTEGRATION OF POLARIZED DEUTERONS BY POLARIZED ELECTRONS AND $G_{E_n}$ DETERMINATION		
M.P.Rekalo, G.I.Gakh and A.P.Rekalo .....	56	
ASYMMETRY IN $\bar{D}(\bar{e},e^+p)n$ REACTION AND NEUTRON CHARGE FORM FACTOR		
M.P.Rekalo, G.I.Gakh and A.P.Rekalo .....	58	

OUT-OF-PLANE MEASUREMENT IN THE $^2D(e,e'p)$ COINCIDENCE EXPERIMENT		
T.Tamae, H.Kawahara, A.Tanaka, M.Nomura, K.Namai, Y.Kawazoe, H.Tsubota, H.Miyase and M.Sugawara .....	60	[ I -14]
TWO-BODY ABSORPTION OF PIONS IN $^3\text{He}$		
O.V.Maxwell and C.Y.Cheung .....	62	
ABSORPTION OF $\pi^+$ AND $\pi^-$ ON $^3\text{He}$		
G.Backenstoss, M.Izycki, P.Salvisberg, M.Steinacher, P.Weber, H.J.Weyer, S.Cierjacks, S.Ljungfelt, H.Ullrich, M.Furic and T.Petkovic .....	64	
3-NUCLEON-ABSORPTION OF PIONS IN $^3\text{He}$		
G.Backenstoss, M.Izycki, P.Salvisberg, M.Steinacher, P.Weber, H.J.Weyer, S.Cierjacks, S.Ljungfelt, H.Ullrich, M.Furic and T.Petkovic .....	66	
pd $\rightarrow$ dp AT INTERMEDIATE ENERGIES		
A.Nakamura and L.Satta .....	68	
MEASUREMENT OF d-d TOTAL CROSS SECTIONS IN THE INCIDENT MOMENTUM RANGE OF 1.5 - 4.0 GeV/c		
T.Kishida, K.Ishikawa, M.Kuze, T.Tsuboyama, F.Sai, S.S.Yamamoto, T.Maki, I.Arai, A.Manabe, H.Nunokawa and H.Koiso .....	70	[ I -15]
NUCLEON SIZE AND THE ATTRACTIVE NUCLEAR FORCE		
M.Oka and R.D.Amado .....	72	
REFINED TREATMENT OF THE NUCLEAR BINDING AND FERMI MOTION ON THE EMC EFFECT		
K.Nakano and J.Rafelski .....	74	[ I -16]
REALISTIC PREDICTION ON THE SIZE OF BOUND NUCLEON BY QUASIELASTIC ELECTRON SCATTERING		
K.Nakano .....	76	[ I -17]
NEW THEORY OF "ANOMALONS" AND $^4\text{He-p}$ INTERACTION IN A BUBBLE CHAMBER		
Y.E.Kim .....	78	[ I -18]

PROPERTIES OF  $\Lambda_b(1405)$  DEDUCED FROM  $K^-$  CAPTURE

R.Staronski and S.Wycech ..... 80

 $\pi^+ - p$  AND  $\pi^- - p$  ELASTIC SCATTERING FROM 67 MeV TO 143 MeV

J.T.Brack, J.J.Kraushaar, J.H.Mitchell,  
 R.J.Peterson, R.A. Ristinen, J.L. Ullmann,  
 D.R.Gill, R.R.Johnson, M.Sevior, G.R.Smith,  
 F.Tervisidis, P.Trelle and E.L.Mathie ..... 82 [ I -19]

IMPROVED DISPERSION RELATIONS AND CDD POLE IN THE LOW EQUATION FOR THE  $\pi N P$  WAVE

K.Nakano and Y.Nogami ..... 84

WHY ANTIPROTONS ARE INEFFECTIVE IN BREAKING NUCLEI IN REACTIONS  $A(p, p')X$  ?

L.A.Kondratyuk, A.Rotondi and M.G.Sapozhnikov ..... 86

ANTIPROTON INTERACTION ON  ${}^4\text{He}$  AT LOW ENERGIES

F.Balestra, Yu.A.Batusov, G.Bendiscioli, S.Bossolasco,  
 M.P.Bussa, L.Busso, I.V.Falomkin, L.Ferrero,  
 C.Guaraldo, E.Lodi Rizzini, A.Maggiora, D.Panzieri,  
 G.Piragino, G.B.Pontecorvo, A.Rotondi, P.Salvini,  
 M.G.Sapozhnikov, F.Tosello and A.Zenoni ..... 88 [ I -20]

II QCD, Skyrmion, Quarks

## THE TOPONIUM STATES IN THE TWO-STEP POTENTIAL MODEL

D.S.Kulshreshtha ..... 94 [ II - 1]

## THE HEAVIER NAKED BEAUTY AND OPEN TOP STATES IN THE TWO-STEP POTENTIAL MODEL

D.S.Kulshreshtha ..... 96 [ II - 2]

BOUND  $q\bar{q}$  AND  $qqq$  SYSTEMS WITH LIGHT QUARKS WITHIN THE FRAMEWORK OF SALPETER EQUATIONS

M.Sh.Chachkhunashvili and T.I.Kopaleishvili ..... 98

## NON-RELATIVISTIC POTENTIAL MODEL FOR BARYON PROPERTIES

R.Nag, S.Sanyal and S.N.Mukherjee ..... 100 [II - 3]

## RELATIVISTIC EFFECTS IN PION ELECTROMAGNETIC FORM FACTORS

P.L.Chung and W.N.Polyzou ..... 102 [II - 4]

## STRONG DECAY WIDTHS OF HADRONS AND HYBRIDS

G.Bhamathi ..... 104 [II - 5]

THE  $P_{11}$   $\pi$ -N AMPLITUDE IN THE CLOUDY BAG MODEL

B.C.Pearce and I.R.Afnan ..... 106 [II - 6]

## THE EFFECTS OF BAG MOTION ON NUCLEON STATIC PROPERTIES

M.Bolsterli and J.A.Parmentola ..... 108 [II - 7]

## A VARIATIONAL APPROACH TO THE CHIRAL QUARK MODEL

Y.Futami, Y.Odajima and A.Suzuki ..... 110

## THE SKYRMION COUPLED WITH THE GAUGED VECTOR MESONS

T.Otofuji, S.Saito and M.Yasuno ..... 112 [II - 8]

## A SIMPLE PARAMETRIZATION OF THE NONLOCAL PART OF THE SHORT RANGE NN INTERACTION IN THE CONSTITUENT QUARK MODEL

G.Spitz and E.W.Schmid ..... 114

## THE BARYON-BARYON INTERACTION IN A QUARK MODEL WITH QUARK-ANTIQUARK EXCITATIONS

Y.Fujiwara and K.T.Hecht ..... 116

## QUARK INTERCHANGE AND DEUTERON ELECTROMAGNETIC FORM FACTOR

M.Chemtob and S.Furui ..... 118 [II - 9]

## EFFECTS OF THE HIDDEN COLOR DYNAMICS IN THE FLIP-FLOP MODEL

Y.Koike and K.Yazaki ..... 120 [II - 10]

PAULI BLOCKING EFFECT IN A CLUSTERIZED  $3n$ -QUARK SYSTEM

S.Takeuchi and K.Shimizu ..... 122 [II-11]

MESON-MESON INTERACTION WITH A STRING FLIP-FLOP MODEL  
FOR QUORK CONFINEMENT

K.Masutani ..... 124 [II-12]

COMPARISON OF VECTOR-MESON EXCHANGE VERSUS ONE-GLUON-  
EXCHANGE IN A CONSTITUENT QUARKMODEL

J.Burger and H.M.Hofmann ..... 126

THE SKYRMION-SKYRMION INTERACTION IN THE MODIFIED  
SKYRME MODELT.Otofuji, S.Saito, M.Yasuno, T.Kurihara and  
H.Kanada ..... 128 [II-13] $p\bar{p}$ -ANNIHILATION AND SCATTERING IN THE QUARK MODEL

M.Maruyama, S.Furui and A.Faessler ..... 130 [II-14]

ARE THERE LOOSE QUARKS IN NUCLEI ?  
THE THREE-NUCLEON-BOUND STATE AS ONE TEST CASE

U.Oelfke and P.U.Sauer ..... 134

A PROPOSAL FOR THE CALCULATION OF THE S-MATRIX FOR  
HADRON-HADRON SCATTERING FROM LATTICE QCD

M.Faber, H.Markum, M.Meinhart and W.Schweiger ..... 136 [II-15]

LARGE  $N$  LIMITS OF QUANTUM CHROMODYNAMICS AS A FOUNDATION  
OF MESON-EXCHANGE DESCRIPTION OF FEW-BARYONIC FORCES

E.Kiritsis and R.Seki ..... 138

A NEW MODEL FOR SHORT-RANGE NN INTERACTIONS:  
SHORT-RANGE ATTRACTION VS A REPULSIVE COREV.I.Kukulin, V.M.Krasnopol'sky  
and V.N.Pomerantsev ..... 140INFLUENCE OF THE HADRONIC FIELD OF THE OPEN SCATTERING  
CHANNEL ON THE RADIUS AND THE MASS OF A COMPOUND  
QUARK-GLUON BAG

A.N.Safronov ..... 142

REACTION $\bar{p}+d \rightarrow \pi^-+p$ AND (6q)-COMPONENT IN A DEUTERON	
L.A.Kondratyuk and M.G.Sapozhnikov .....	144
FORM FACTORS OF D, $^3\text{H}$ , $^3,4\text{He}$ WITH THE QUARK AND MESON DEGREES OF FREEDOM INCLUDED	
V.V.Burov and V.K.Lukyanov .....	146
FORM FACTOR AND DEUTERON POLARIZATION WITH MESON AND QUARK DEGREES OF FREEDOM	
V.V.Burov, V.N.Dostovalov and V.K.Lukyanov .....	148
THE METHOD OF HYPERSPHERICAL FUNCTIONS AS APPLIED OF A THREE-QUARK SYSTEM PROPERTIES TO THE STUDY	
V.V.Burov and K.V.Shitikova .....	150
A NEW APPROACH TO THE DIBARYON RESONANCES PHYSICS	
I.L.Grach, Yu.S.Kalashnikova and I.M.Narodetskii ...	152
S-WAVE $\pi N$ INTERACTIONS AND MULTIQUARK BAGS	
I.L.Grach, Yu.S.Kalashnikova and I.M.Narodetskii ...	154
BAG MODEL MOTIVATED NUCLEON-NUCLEON INTERACTIONS AND THREE-NUCLEON SYSTEMS	
I.L.Grach, Yu.S.Kalashnikova and I.M.Narodetskii ...	156

### III Theoretical Techniques in Few-Body Physics

LOW ENERGY POTENTIAL SCATTERING IN THE SHIFTED LARGE-DIMENSION EXPANSION TECHNIQUE		
R.Dutt .....	162	[III- 1]
APPLICATION OF THE MULTICHANNEL LVM-ST TO THE MODIFIED HUCK PROBLEM		
B.Apagyai, K.Ladanyi and P.Levay .....	164	
TO THE THEORY OF SCATTERING ON TWO POTENTIALS		
V.B.Belyaev, A.Sh.Latipov and A.L.Zubarev .....	166	



## INVERSION PROBLEM FOR SAITO POTENTIALS

B.Talukdar, G.C.Sett and U.Laha ..... 168 [III- 2]

## SEPARABLE EXPANSION METHOD IN SCATTERING CALCULATIONS

J.Mares, J.Revai, M.Sotona and J.Zofka ..... 170 [III- 3]

## JOST-LIKE FUNCTIONS IN MOMENTUM SPACE

L.Tomio and S.K.Adhikari ..... 172 [III- 4]

## EXACT SOLUTIONS FOR THREE-DIMENSIONAL AXIAL-SYMMETRICAL POTENTIALS

A.A.Suzko ..... 174

## CALCULATION OF THE TWO-BODY S-MATRIX OF THE NON-LINEAR SCHRÖDINGER MODEL IN A NON-PETURBATIVE APPROACH

R.Girard and H.Kroeger ..... 176

COMPUTATION OF BINDING ENERGIES OF  $\text{He}^3$  AND OF  $\text{H}^3$  FROM FADDEEV EQUATIONS

D.S.Saloupis ..... 178

ROTATIONAL INVARIANT THREE-BODY MOLECULAR APPROACH TO  $^9\text{Be}$ 

A.C.Fonseca and M.T.Pena ..... 180 [III- 5]

## THE TRIAD OF THREE-PARTICLE LIPPMANN-SCHWINGER EQUATIONS

F.S.Levin and W.Sandhas ..... 182 [III- 6]

## A NEW APPROACH TO FEW-BODY EQUATIONS

R.J.Slobodrian ..... 184

## ASYMPTOTICS OF EFFECTIVE POTENTIALS AND WAVE FUNCTIONS OF THE THREE-BODY PROBLEM IN SUITABLE COORDINATES

M.B.Kadomtsev and S.I.Vinitsky ..... 186

## AN EQUIVALENCE BETWEEN OFF-SHELL MODIFICATION OF TWO-BODY POTENTIALS AND A THREE-BODY POTENTIAL

S.Nakaichi-Maeda ..... 188

## THREE-BODY INVERSE PROBLEM

B.N.Zakhariev ..... 190

## A METHOD FOR ANALYZING THE REACTIONS OF FOUR-PARTICLE SYSTEMS IN THE (2,2) CHANNEL (PART A)

L.I.Galanina and N.S.Zelenskaya ..... 192

## A METHOD FOR ANALYZING THE REACTIONS OF FOUR-PARTICLE SYSTEMS IN THE (2,2) CHANNEL (PART B)

L.I.Galanina and N.S.Zelenskaya ..... 194

## DIRECT RELATIONS BETWEEN DIFFERENT APPROACHES TO THE N-BODY PROBLEM

G.Cattapan and V.Vanzani ..... 196

## ITERATIVE IMPROVEMENT OF ADIABATIC SOLUTION IN K-HARMONICS TECHNIQUE: EXAMPLE ALPHA PARTICLE

S.Sanyal ..... 198

## CALCULATION OF GEOMETRICAL STRUCTURE COEFFICIENTS FOR THE HYPERSPHERICAL HARMONICS METHOD

T.K.Das and T.B.De ..... 200 [III- 7]

## ON THE ALGEBRA OF FEW-BODY HYPERSPHERICAL FUNCTIONS

R.I.Jibuti and N.I.Shubitidze ..... 202

## ASYMPTOTIC BEHAVIOR OF THE MANY-BODY WAVE FUNCTION

M.Fabre de la Ripelle and S.Y.Larsen ..... 204

TISM FOR LIGHT  $0_{1}^{\omega}$  CORE HYPERNUCLEI

O.Richter ..... 206 [III- 8]

MICROSCOPICAL THEORY OF FOUR-BODY HYPERNUCLEI STRUCTURE AND OF THE REACTION  ${}^4\text{H} \rightarrow \pi^{-} + {}^4\text{He}$ 

R.I.Jibuti, N.B.Krupennikova, L.L.Sarkisyan  
and Sh.M.Tsiklauri ..... 208

## STRUCTURES AND INTERNAL MOTIONS IN HELIUM ATOM

C.G.Bao ..... 210

EIKONAL APPROXIMATION OF THE RELATIVISTIC TWO-FRAGMENT  
SCATTERING AMPLITUDE FOR THREE CHARGED SPINLESS  
PARTICLES

E.O.Alt and M.Hannemann ..... 212 [III- 9]

THE PROJECTION-OPERATOR SCHEME TO DESCRIBE MANY-BODY  
SCATTERING

V.I.Kukul'in and V.N.Pomerantsev ..... 214

CONSTRUCTION OF THE ENERGY-DEPENDENT NUCLEON-NUCLEON  
POTENTIAL BY SOLVING THE INVERSE SCATTERING PROBLEM

L.D.Blokhintsev, V.K.Lipatkin and A.N.Safronov ..... 216

ALGEBRIZATION OF THE MULTICHANNEL SCATTERING PROBLEM  
BY NEGATIVE-ENERGY STRUMIAN EXPANSION

G.Pisent, L.Canton and G.Cattapan ..... 218

FINITE-DIFFERENCE SOLUTION OF 3-BODY SCHRÖDINGER  
EQUATION

M.V.Ivanov ..... 222 [III-10]

IV Cluster and Reactions

ON THE INVESTIGATION OF THE ADIABATIC APPROXIMATION  
TO THE HYPERSPHERICAL HARMONIC METHOD

G.Jiang and S.N.King ..... 228

STRUCTURE STUDY OF THE  ${}^9\text{Be}$  HYPERNUCLEUS BY THE  
MICROSCOPIC  $(\alpha + 3N + N) + \Lambda$  CLUSTER MODEL

T.Yamada, K.Ikeda, H.Bando and T.Motoba ..... 230 [IV- 1]

EVIDENCE OF CLUSTER STRUCTURE IN THE LIGHT  $\Lambda$   
HYPERNUCLEI

Weiwei Wang ..... 232

$\Lambda$  N EXCHANGE-FORCE EFFECTS ON THE BINDING ENERGIES OF  
 ${}^5_\Lambda\text{He}$ ,  ${}^9_\Lambda\text{Be}$ ,  ${}^6_\Lambda\text{He}$  AND  ${}^{10}_\Lambda\text{Be}$  HYPERNUCLEI

Xi-cang Wang, H.Takaki and H.Bando ..... 234

OFF-SHELL EQUIVALENCE OF THE FISH BONE OPTICAL MODEL AND THE RESONATING GROUP MODEL IN THE $\alpha$ - $^{16}\text{O}$ SYSTEM		
H.Klar, G.Spitz and E.W.Schmid .....	236	
PAULI REPULSION OF THE $\alpha\alpha$ SYSTEM AND THE $3\alpha$ OVERBINDING PROBLEM		
S.Nakaichi-Maeda and H.Walliser .....	238	
QUANTAL EQUIVALENT LOCAL POTENTIALS FROM RGM N- $\alpha$ NONLOCAL INTERACTIONS		
S.A.Sofianos .....	240	[IV- 2]
$\mu$ -TRUNCATION METHOD FOR MULTI-CLUSTER MODEL		
K.Kato, H.Kazama and H.Tanaka .....	242	[IV- 3]
$\alpha$ -REDUCED WIDTH OF HIGHLY-EXCITED STATES IN $^{24}\text{Mg}$		
K.Kato, H.Kazama and H.Tanaka .....	244	[IV- 4]
$\alpha$ - $^{16}\text{O}$ - $\alpha$ LINEAR CHAIN STRUCTURE IN THE HIGHLY-EXCITED STATES OF $^{24}\text{Mg}$		
K.Kato, H.Kazama and H.Tanaka .....	246	[IV- 5]
CLUSTER AND SYMPLECTIC EXCITATIONS IN GIANT RESONANCE REGION		
Y.Suzuki .....	248	[IV- 6]
ON THE REGULARIZATION THE BRINK'S MODEL WITH TETRAHEDRAL FORM OF THE ALPHA-CLUSTER APPLIED		
V.S.Kinchakov .....	250	[IV- 7]
ON THE CLUSTER STRUCTURE OF NUCLEI $^9\text{Be}$ , $^{10}\text{Be}$ , $^{10}\text{B}$ , $^{25}\text{Mg}$		
V.S.Kinchakov .....	252	[IV- 8]
PARAMETERS OF $^8\text{Li}$ MULTICHANNEL SYSTEM RESONANCES ARISING UNDER SCATTERING OF NEUTRON ON $^7\text{Li}$		
S.A.Badalov, V.M.Belenky, G.F.Filippov .....	254	
$^7\text{Li}$ TENSOR ALIGNMENT AND ASTROPHYSICAL S-FACTOR FOR $\alpha + t \rightarrow ^7\text{Li} + \gamma$ PROCESS		
T.Kajino, K.-I.Kubo .....	256	[IV- 9]

CHARGE FORM FACTORS FOR  ${}^6\text{Li}$  AND  ${}^7\text{Li}$  IN THE CLUSTER  
MODEL

H.M.Hofmann, T.Mertelmeier and D.Sachsenweger ..... 258 [IV-10]

CALCULATION OF  ${}^{12}\text{C}$  ENERGY SPECTRA BY 3- $\alpha$  FADDEEV  
EQUATION WITH THE UIM POTENTIAL AND THE KN-TYPE  
POTENTIALS

H.Kamada and S.Oryu ..... 260 [IV-11]

CALCULATION OF  ${}^{16}\text{O}$  ENERGY SPECTRA BY 4- $\alpha$  FADDEEV-  
YAKUBOVSKY EQUATION

T.Nishino, H.Sekine, H.Kamada and S.Oryu ..... 262 [IV-12]

INCLUSION OF THREE BODY FINAL STATE COUPLING IN THE  
DWIA ANALYSES OF CLUSTER KNOCK-OUT REACTIONS

A.K.Jain ..... 264 [IV-13]

THREE-BODY MODEL OF DEUTERON-NUCLEUS COLLISIONS

R.Kozack and F.S.Levin ..... 266 [IV-14]

MOMENTUM DISTRIBUTION AND THE MEAN FREE PATH OF  
NUCLEONS IN NUCLEAR MATTER

J.Dabrowski ..... 268

REAL ENERGY LIMIT OF THE CG EQUATIONS

C.Chandler and A.G.Gibson ..... 270 [IV-15]

MULTI THREE-CLUSTER COUPLING MODEL OF NUCLEAR REACTIONS

K.Miyagawa, T.Ueda, T.Sawada and S.Takagi ..... 272 [IV-16]

THREE-BODY MODEL OF THE  ${}^6\text{Li} \rightarrow p + (n\alpha)$  VERTEX

C.T.Christou, D.R.Lehman and W.C.Parke ..... 274 [IV-17]

ASYMPTOTIC CONDITIONS AND THE NON-UNIQUENESS PROBLEM  
IN A NON-FADDEEV APPROACH TO THREE-BODY BREAKUP  
REACTIONS

T.Sawada and K.Thushima ..... 276

EXACT TRANSFER AMPLITUDE IN THE MOLECULAR THREE-BODY  
APPROACH TO NUCLEAR REACTION

Y.Abe and A.V.Matveenko ..... 278 [IV-18]

$\alpha$ -DECAY AND CAUSALITY

M.K.Basu ..... 280 [IV-19]

DO  ${}^6\text{Li}$  KNOCKOUT DATA DETERMINE CLUSTER MOMENTUM  
DISTRIBUTIONS?

R.E.Warner ..... 282 [IV-20]

FINDING OF A  $0_2^+$  STATE IN  ${}^{12}\text{C}$  VIA  ${}^{11}\text{B}(\alpha, t\alpha){}^8\text{Be}$  REACTION

M.Yasue, S.Kubono, M.H.Tanaka, K.Ogino,  
T.Kiuchi, T.Motobayashi and S.Sato ..... 284 [IV-21]

CONTINUUM SPECTRA OF TARGET BREAKUP IN THE  ${}^6\text{Li}$  AND  
 ${}^7\text{Li}(p, p')$  REACTIONS

M.Tosaki, M.Fujiwara, K.Hosono, T.Noro,  
H.Ito, T.Yamazaki, H.Ikegami and M.Kamimura ..... 286

THREE BODY BREAKUP PROCESSES IN  ${}^7\text{Li}+\vec{p}$  REACTION AT 16 MeV

N.Koori, I.Kumabe, M.Hyakutake, K.Orito,  
Y.Watanabe, K.Ogawa, K.Akagi, N.Oda, K.Sagara,  
H.Nakamura, K.Maeda, T.Nakashima and M.Kamimura .... 288 [IV-22]

PHASE-SHIFT ANALYSIS OF  $\alpha$ -d SCATTERING RELEVANT  
TO THE CONSTRUCTION OF ANALYTICAL S-MATRIX FROM  
EXPERIMENTAL DATA

V.M.Krasnopol'sky, V.I.Kukul'in and E.V.Kuznetsova .. 290

STRUCTURE OF LOW-LYING STATES IN THE  $A=9$  NUCLEI  
IN TERMS OF THE DYNAMIC THREE-BODY MODEL

V.M.Krasnopol'sky, V.T.Voronchev, B.G.Kaganov,  
V.I.Kukul'in and D.V.Rutgauzer ..... 292

V Few-Nucleon Theory

NUCLEON-NUCLEON STATIC POTENTIAL DUE TO PION EXCHANGE

M.Bolsterli ..... 298 [V-1]

## PHASE SHIFT ANALYSIS OF 0 - 30 MeV pp SCATTERING DATA

J.R.Bergervoet, P.C.van Campen, W.A.v.d. Sanden  
and J.J.de Swart ..... 300

THE P-ODD ASYMMETRY OF THE pp-SCATTERING:  
A CONTRIBUTION OF THE ISO-VECTOR TWO-PION EXCHANGE

M.M.Musakhanov and Yu.Yu.Podgornov ..... 302

## ROLE OF NEGATIVE-ENERGY PAIR TERMS IN NN SCATTERING

Th.Hippchen and K.Holinde ..... 304

## CHARGE SYMMETRY BREAKING IN THE n-p INTERACTION

B.Holzenkamp, K.Holinde and A.W.Thomas ..... 306

EXTENSION OF THE BONN MESON-EXCHANGE NN POTENTIAL  
ABOVE THE PION PRODUCTION THRESHOLD

Ch.Elster, K.Holinde, D.Schuette and R.Machleidt ... 308

INABILITY OF ANY RANK-ONE SEPARABLE APPROXIMATION  
TO REPRODUCE THE TENSOR FORCE

L.Crepinsek, K.Schwarz and H.F.K.Zingl ..... 312

OFF-SHELL INFORMATION ON THE SINGLET NEUTRON-PROTON  
INTERACTION FROM THE CAPTURE REACTION  $n+p \rightarrow d+\gamma$ 

K.Moeller ..... 314

THREE-NUCLEON THREE-BODY FORCE IN THE CONTEXT OF  
ADIABATIC  $\pi$  NN AND  $\pi$  NNN EQUATIONS

A.C.Fonseca and M.T.Pena ..... 316 [V - 2]

REMARKS CONCERNING  $\Delta(1232)$ 'S CONTRIBUTION TO THREE-  
NUCLEON FORCE

S.N.Yang ..... 318 [V - 3]

## EFFECT OF CONTACT TERMS OF THREE-BODY FORCE

M.Sato, T.Katayama, Y.Akaishi and H.Tanaka ..... 320 [V - 4]

A NEW VERSION FOR THE TWO-PION EXCHANGE THREE-NUCLEON  
POTENTIAL

M.R.Robilotta, H.T.Coelho and M.P.Isidro Filho ..... 322

THE TWO-PION EXCHANGE THREE-NUCLEON POTENTIAL AND  
P WAVES IN THE TRINUCLEON SYSTEM

O.A.Battistel, H.T.Coelho and M.R.Robilotta ..... 324

A NEW ESTIMATE OF TRITON ASYMPTOTIC NORMALIZATIONS

T.Frederico, S.K.Adhikari and M.S.Hussein ..... 326

CALCULATION OF TRITON BINDING ENERGY INCLUDING MIXED  
SYMMETRY STATE AND THREE BODY FORCE

T.B.De and T.K.Das ..... 328 [V - 5]

THE NUCLEAR THREE BODY PROBLEM AND ENERGY-DEPENDENT  
POTENTIALS

A.Abdurakhmonov, B.F.Irgaziev and A.L.Zubarev ..... 330

ON THE ACCURACY OF ATMS METHOD

H.Morita, Y.Akaishi and H.Tanaka ..... 332 [V - 6]

THE ATMS CALCULATIONS OF TRITON FOR PARIS AND REID  
(V12) POTENTIALS

I.Arisaka, K.Nakagawa, T.Obinata and M.Wada ..... 334

SEMICLASSICAL MODELS IN THE THREE CHARGED PARTICLES  
SCATTERING THEORY

Yu.V.Popov ..... 336

NUCLEON-DEUTERON EFFECTIVE INTERACTION

A.Delfino, L.Tomio and S.K.Adhikari ..... 338

ON THE DIRECT MECHANISM OF  ${}^6\text{Li}(\gamma, p)$  PHOTODISINTEGRATION

B.F.Irgaziev, R.Yarmukhamedov and G.V.Avakov ..... 340

FADDEEV CALCULATION OF p-d ELASTIC SCATTERING BY  
A TWO-BODY LOCAL POTENTIAL

T.Takemiya ..... 342 [V - 7]

LOW ENERGY p-d DIFFERENTIAL CROSS SECTIONS AND DOUBLET  
S-STATE EFFECTIVE RANGE PARAMETERS

G.H.Berthold and H.Zankel ..... 344 [V - 8]



ELASTIC n-d DIFFERENTIAL CROSS SECTION FROM THE PARIS  
N-N POTENTIAL

Y.Koike, J.Haidenbauer and W.Plessas ..... 346 [V - 9]

PARIS POTENTIAL PREDICTIONS FOR ELASTIC N-d SPIN-  
TRANSFER COEFFICIENTS

Y.Koike, J.Haidenbauer and W.Plessas ..... 348 [V -10]

CONVERGENCE TEST FOR THE EST METHOD IN NUCLEON-  
DEUTERON SCATTERING CALCULATIONS

J.Haidenbauer and Y.Koike ..... 350 [V -11]

GENERAL FUNCTIONAL RELATION BETWEEN NUCLEON MOMENTUM  
AND DENSITY DISTRIBUTIONS IN NUCLEI

A.N.Antonov and I.Zh.Petkov ..... 352

A STUDY OF SHORT-RANGE CORRELATION EFFECTS ON NUCLEAR  
SPATIAL AND MOMENTUM DISTRIBUTIONSA.N.Antonov, P.E.Hodgson, A.Malecki  
and I.Zh.Petkov ..... 354PHOTODISINTEGRATION OF  $^4\text{He}$  INCLUDING EXCHANGE CURRENTS

S.A.Sofianos, H.Fiedeldey and W.Sandhas ..... 356 [V -12]

AN INTEGRO-DIFFERENTIAL EQUATION APPLICABLE TO FEW-  
AND MANY-BODY BOUND STATESM.Fabre de la Ripelle, H.Fiedeldey  
and S.A.Sofianos ..... 360 [V -13]REARRANGMENT SCATTERING OF FOUR NUCLEONS AS A  
FOUR-BODY PROBLEM

A.Osman ..... 362 [V -14]

CONTRIBUTION OF P-WAVE NUCLEON-NUCLEON CHANNELS  
TO  $n^3\text{H}$  AND  $p^3\text{He}$  ELASTIC DATA

A.C.Fonseca ..... 364 [V -15]

COMPETING QUASI TWO-BODY PROCESSES IN FOUR-NUCLEON  
BREAK-UP

T.E.Mdlalose, H.Fiedeldey and W.Sandhas ..... 366 [V -16]

EFFECTIVE TWO-BODY  $p$ - $^3\text{He}$  POTENTIALS AND PREDICTION  
OF LOW ENERGY  $n$ - $^3\text{H}$  PHASE SHIFTS

A.Stadler and H.Zankel ..... 368 [V-17]

THE  $^2\text{H}(d, \gamma)^4\text{He}$  CAPTURE REACTION AND THE D-STATE  
ADMIXTURE IN  $^4\text{He}$ 

H.M.Hofmann, T.Mertelmeier and B.Wachter ..... 370

DEUTERON STRUCTURE: COMPARATIVE STUDY OF DIFFERENT  
NN-FORCE TYPESV.M.Krasnopol'sky, V.I.Kukulin, V.N.Pomerantsev  
and P.B. Sazonov ..... 372DESCRIPTION OF TRIPLET-ODD NN PHASE SHIFTS IN TERMS  
OF THE POTENTIAL MODEL WITH FORBIDDEN STATESV.N.Pomerantsev, V.M.Krasnopol'sky  
and V.I.Kukulin ..... 374

## ON CHARGE SYMMETRY BREAKING AND THREE-BODY FORCES

I.Rotter ..... 376

## ELASTIC ELECTRON-DEUTERON SCATTERING

M.A.Brown and M.V.Tokarev ..... 378 [V-18]

A NUCLEON MOMENTUM DISTRIBUTION FOR THE DEUTERON  
WAVE FUNCTION WITH A CORE

M.V.Tokarev ..... 380 [V-19]

EFFECTS OF NUCLEAR REACTION FINITE TIME IN MUON  
STICKING TO HELIUM

V.E.Markushin ..... 382

NON-RADIATIVE FUSION IN  $pd\mu$  MESIC MOLECULEL.N.Bogdanova, Yu.A.Kuperin, A.A.Kvitsinsky,  
V.E.Markushin, S.P.Merkuriev and L.I.Ponomarev ..... 384 [V-20]THE PROBABILITY OF MUON STICKING TO HELIUM IN THE  
MUON CATALYZED FUSION BEYOND THE BORN-OPPENHEIMER  
APPROXIMATIONL.N.Bogdanova, V.E.Markushin, V.S.Melezhik  
and L.I.Ponomarev ..... 386 [V-21]

THE ROLE OF PROTON POLARIZABILITY IN THE REACTION  
 $p+p-d+e^++\nu$  AT ASTROPHYSICAL LOW ENERGIES

V.B.Belyaev and V.E.Kuzmichev ..... 388

VI Few-Nucleon Experiments

RESOLUTION OF THE DISCREPANCIES IN THE POLARIZATION  
 FOR LOW ENERGY NEUTRON-PROTON SCATTERING

J.Sromicki, W.Haeberli, D.Holslin and P.A.Quin ..... 394 [VI- 1]

MEASUREMENT OF THE np DIFFERENTIAL CROSS SECTION  
 FROM 22 TO 50 MeV

G.Fink, P.Doll, R.Garrett, W.Heeringa,  
 K.Hofmann, H.O.Klages and H.Krupp ..... 396

THE  $\vec{n}\vec{p}$  SPIN CORRELATION PARAMETER  $A_{\nu\nu}$  IN THE ENERGY  
 RANGE FROM 17 TO 50 MeV

H.Krupp, P.Doll, V.Eberhard, W.Heeringa,  
 H.O.Klages, Chr.Woelfi and J.Wilczynski ..... 398

THE FORWARD PHOTODISINTEGRATION OF THE DEUTERON  
 AT LOW ENERGIES AND PLANS FOR RELATED EXPERIMENTS

A.de Graeve, R.Van de Vyver, H.Ferdinande,  
 P.Berkvens, D.Ryckbosch, L.van Hoorebeke,  
 P.van Otten, A.Zieger and B.Ziegler ..... 400 [VI- 2]

MEASUREMENT OF ANALYZING POWERS ON p-d ELASTIC  
 SCATTERING

T.Hasegawa, K.Nisimura, H.Hasai, K.Iwatani,  
 H.Shimizu and H.Ueno ..... 402 [VI- 3]

MEASUREMENTS OF DEPolarIZATION PARAMETERS IN p-d  
 ELASTIC SCATTERING AT  $E_p=65$  MeV

M.Nakamura, H.Sakaguchi, H.Ogawa, M.Yosoi,  
 T.Ichihara, N.Isshiki, M.Ieiri, Y.Takeuchi,  
 S.Kobayashi, H.Sakamoto, T.Noro, H.Ikegami  
 and P.Schwandt ..... 404 [VI- 4]

THE NEUTRON-NEUTRON SCATTERING LENGTH DERIVED FROM  
KINEMATICALLY INCOMPLETE MEASUREMENT AT 63 MeV

N.Koori, M.Hyakutake, M.Matoba, H.Ijiri, Y.Fujita,  
S.Shirato, T.Motobayashi and T.Ohsawa ..... 406 [VI- 5]

CALCULATION OF THE  $p(d,pp)n$  CROSS SECTION IN THE  
SAM-APPROACH

H.Kroeger, A.M.Nachabe and R.J.Slobodrian ..... 408

CROSS SECTION MEASUREMENT OF THE  ${}^2\text{H}(n,t)\gamma$  REACTION  
AT  $E_n = 25$  MeV

J.Moesner, K.Moeller, W.Pilz, G.Schmidt and  
T.Stiehler ..... 410

REANALYSIS OF THE  ${}^2\text{H}(n,p)2n$  DATA AT 50 MeV

S.Shirato, Y.Ishibe and K.Shibata ..... 412 [VI- 6]

$K\check{Y}(0^\circ)$  FOR THE  ${}^2\text{H}(\vec{p},\vec{n})2p$  REACTION AT 50, 65 AND 80 MeV

H.Sakai, M.Ieiri, K.Imai, N.Matsuoka, T.Motobayashi,  
T.Saito, A.Sakaguchi, A.Shimizu and M.Tozaki ..... 414

MECHANISM OF FOUR-BODY BREAKUP IN  $\vec{d}+d$  REACTION AT 56 MeV

T.Ohsawa, K.Fukunaga, S.Kakigi, A.Okihana,  
T.Sekioka, S.Seki and T.Murayama ..... 416 [VI- 7]

${}^3\text{He}$  BRAEKUP REACTION BY POLARIZED PROTON AT 65 MeV  
IN THE FSI REGION

A.Okihana, K.Fukunaga, S.Kakigi, T.Ohsawa,  
T.Sekioka and R.Takashima ..... 418 [VI- 8]

ANALYSIS OF HIGH PRECISION MEASUREMENTS OF CROSS  
SECTION AND ANALYZING POWERS  $iT_{11}$ ,  $T_{20}$ ,  $T_{21}$  AND  $T_{22}$   
OF THE REACTION  ${}^3\text{He}(d,p){}^4\text{He}$

M.Bittcher, V.Koenig, P.A.Schmelzbach, Ch.Forstner,  
W.Gruebler, B.Vuaridel, D.Singy and J.Ulbricht ..... 420 [VI- 9]

ALPHA - DEUTERON ELASTIC SCATTERING AT 40 MeV

S.S.Dasgupta, T.Roychaudhury, D.Sen,  
S.N.Chintalapudi, S.R.Banerjee, M.Ismail  
and A.S.Divatia ..... 422 [VI-10]

POLARIZATION MONITOR OF  $p_{xz}(t_{21})$  COMPONENT FOR DEUTERONS  
IN THE CYCLOTRON ENERGY REGION

N.Matsuoka, H.Tamura, H.Sakai, H.Ito and T.Saito ... 424 [VI-11]

DETERMINATION OF THE TRINUCLEON D- TO S-STATE ASYMPTOTIC  
NORMALIZATION FROM THE  ${}^4\text{He}(d, {}^3\text{He}){}^3\text{H}$  ANALYZING POWERS  
AND CROSS SECTION MEASUREMENTS

B.Vuaridel, W.Gruebler, V.Koenig, P.A.Schmelzbach,  
K.Elsener, J.Ulbricht, D.Singy, Ch.Forstner  
and M.Bittcher ..... 426 [VI-12]

BREAKEUP OF  ${}^3\text{He}$  BY ALPHA PARTICLES AT 119.2 MeV

T.Sekioka, K.Fukunaga, S.Kakigi, T.Ohsawa, A.Okihana,  
H.Nakamura-Yokota, S.Tanaka and S.Kato ..... 428 [VI-13]

CHARGE SYMMETRY IN  $(d, n\gamma)$  AND  $(d, p\gamma)$  REACTIONS  
ON  ${}^6\text{Li}$  AND  ${}^9\text{Be}$  AT LOW ENERGIES

R.J.Peterson and F.E.Cecil ..... 430

SYMMETRY BETWEEN NEUTRON- AND PROTON- INDUCED  
REACTIONS ON  ${}^6\text{Li}$  AND  ${}^7\text{Li}$  AT 14 MeV

I.Furutate, Y.Ando, T.Kokubu, T.Motobayashi, S.Satoh,  
S.Shirato, M.Fujiwara, M.Tosaki and M.Kamimura ..... 432 [VI-14]

VIOLATION OF CHARGE SYMMETRY IN  $\pi^{\pm}$  ELASTIC SCATTERING  
FROM  ${}^3\text{He}$  AND  ${}^3\text{H}$

Y.E.Kim, M.Krell and L.Tiator ..... 434 [VI-15]

A PRECISION TEST OF CHARGE INDEPENDENCE

K.K.Seth, M.Artuso and D.Barlow ..... 436 [VI-16]

DETERMINATION OF THE NUCLEAR VERTEX FUNCTION  ${}^3\text{He} \rightarrow \text{ppn}$   
FROM  ${}^3\text{He} p \rightarrow \text{pppn}$  REACTION DATA AT THE  ${}^3\text{He}$  MOMENTA OF  
2.5 AND 5 GeV/c

A.V.Blinov, I.V.Chuvilo, V.A.Ergakov, V.E.Grechko,  
Yu.V.Korolev, Ya.M.Selektor, V.V.Soloviev,  
V.N.Shulyachenko, V.F.Turov, I.A.Vanyushin  
and S.M.Zombkovsky ..... 438

DIBARYON RESONANCE 2.9 GeV IN THE ELASTIC BACKWARD  
 $\pi$ -d-SCATTERING

I.V.Chuvilo, L.A.Kondratyuk, I.A.Redkevich,  
 Yu.V.Ralchenko, L.S.Shevchenko and A.V.Vasilets .... 440

HIGH PRECISION ANALYZING POWER MEASUREMENT IN  
 PROTON-PROTON SCATTERING AT 12 MeV

W.Kretschmer, M.Haller, A.Rauscher, R.Schmitt,  
 W.Schuster, W.Gruebler, C.Forstner, V.Koenig,  
 and P.A.Schmelzbach ..... 442 [VI-17]

DEPOLARIZATION MEASUREMENT IN PROTON-PROTON SCATTERING  
 AT 12 MeV

W.Kretschmer, M.Haller, R.Hoepfl, F.Post,  
 A.Rauscher, R.Schmitt, W.Schuster  
 and Dr. Voetisch ..... 444 [VI-18]

NEUTRAL-PION PHOTOPRODUCTION ON THE DEUTERON FOR  
 PHOTONS FROM 500 TO 1000 MeV

H.Akiyama, M.Asai, K.Baba, T.Emura, A.Imanishi,  
 S.Kasai, S.Kato, Y.Kim, T.Miyachi, Y.Morita,  
 M.Nishimura, Y.Sumi, K.Takahashi, H.Tezuka,  
 Y.Wada, and J.Yoshizawa ..... 446