[17] From energy dependence of far backward elastic scattering. Some indication of additional structure.
[18] Not seen by ALBERI 79 with comparable statistics.
[19] Not seen by ALBERI 79 with comparable statistics.
[20] Seen as a bump in the $\overline{p}p \to K^0_S K^0_L$ cross section with $J^{PC} = 1^{--}$.
[21] Isospin 1 favored.
[22] Not seen by BIONTA 80, CARROLL 80, HAMILTON 80, BANKS 81, CHUNG 81, BARNETT 83.
[23] Neutron spectator. See also $np\overline{p}\pi^-(p)$ channel following.
[24] Proton spectator. See also $p\overline{p}n(n)$ channel above.
[25] $I(J^P) = 1(3^-)$ from a mass dependent partial-wave analysis taking solution A.
[26] $I(J^P) = 1(3^-)$ from amplitude analysis assuming one-pion exchange.
[27] Seen in final state $\omega\pi^+\pi^-$.
[28] $I(J^P) = 0(2^+)$ from amplitude analysis assuming one-pion exchange.
[29] ALLES-BORELLI 67B see neutral mode only $\pi^+\pi^-\pi^0$.
[30] $I(J^P) = 0(4^+)$ from a mass dependent partial-wave analysis taking solution A.
[31] $I(J^P) = 0(4^+)$ from amplitude analysis assuming one-pion exchange.
[32] $I(J^P) = 1(5^-)$ from amplitude analysis assuming one-pion exchange.
[33] $I(J^P) = 1(5^-)$ from amplitude analysis of $\overline{p}p \to \pi\pi$.
[34] I=0,1 $J^P = 5^-$ from Barrelet-zero analysis.
[35] Decays to $\overline{N}N$ and $\overline{N}N\pi$. Not seen by BARNETT 83.
[36] Decays to $4\pi^+4\pi^-$.

$\overline{N}N(1100\text{–}3600)$ REFERENCES

CARBONELL 93 PL B306 407 +Protasov, Dalkarov (ISNG, LEBD)
CHIBA 91 PR D44 1933 +Fujitani+ (FUKI, KEK, SANG, OSAK, TMU)
GRAF 91 PR D44 1945 +Fero, Gee+(UCI, PENN, NMSU, KARLK, KARLE, ATHU)
BUSENITZ 89 PR D40 1 +Olszewski, Callahan+ (ILL, FNAL)
CHIBA 88 PL B202 447 +Doi (FUKI, INUS, KEK, SANG, OSAK, TMU)
CHIBA 87 PR D36 3321 +Doi+ (FUKI, INUS, KEK, SANG, OSAK, TMU)
DAFTARI 87 PRL 58 859 +Gray, Kalogeropoulos, Roy (SYRA)
FRANKLIN 87 PL B184 81
ADIELS 86 PL B182 405 +Backenstoss+ (STOH, BASL, LASL, THES, CERN)
ANGELOPO... 86 PL B178 441 Angelopoulos+(ATHU, UCI, KARLK, KARLE, NMSU, PENN)
BRIDGES 86B PRL 56 215 +Daftari, Kalogeropoulos, Debbe+ (SYRA, CASE)
BRIDGES 86D PL B180 313 +Brown, Daftari+ (SYRA, BNL, CASE, UMD, COLU)
ADIELS 84 PL 138B 235 + (BASL, KARLK, KARLE, STOH, STRB, THES)
CLOUGH 84 PL 146B 299 +Beard, Bugg+ (SURR, LOQM, ANIK, TRST, GEVA)
AZOOZ 83 PL 122B 471 +Butterworth (LOIC, RHEL, SACL, SLAC, TOHOK+)
BARNETT 83 PR D27 493 +Blockus, Burka, Chien, Christian+ (JHU)
BODENKAMP 83 PL 133B 275 +Fries, Behrend, Fenner+ (KARLK, KARLE, DESY)
RICHTER 83 PL 126B 284 +Adiels (BASL, KARLK, KARLE, STOH, STRB, THES)
BANKS 81 PL 100B 191 +Booth, Campbell, Armstrong+ (LIVP, CERN)
CHUNG 81 PRL 46 395 +Bensinger+ (BNL, BRAN, CINC, FSU, MASD)
JASTRZEM... 81 PR D23 2784 Jastrzembski, Mandelkern+ (TEMP, UCI, UNM)
ALPER 80 PL 94B 422 +Becker+ (AMST, CERN, CRAC, MPIM, OXF+)
ASTON 80D PL 93B 517 (BONN, CERN, EPOL, GLAS, LANC, MCHS, ORSAY+)
BIONTA 80 PRL 44 909 +Carroll, Edelstein+ (BNL, CMU, FNAL, MASD)
CARROLL 80 PRL 44 1572 +Chiang, Johnson, Cester, Webb+ (BNL, PRIN)
DAUM 80E PL 90B 475 +Hertzberger+ (AMST, CERN, CRAC, MPIM, OXF+)
DEFOIX 80 NP B162 12 +Dobrzynski, Angelini, Bigi+ (CDEF, PISA)
HAMILTON 80 PRL 44 1179 +Pun, Tripp, Lazarus+ (LBL, BNL, MTHO)
HAMILTON 80B PRL 44 1182 +Pun, Tripp, Lazarus+ (LBL, BNL, MTHO)
KREYMER 80 PR D22 36 +Baggett, Fieguth+ (IND, PURD, SLAC, VAND)
ROZANSKA 80 NP B162 505 +Blum, Dietl, Grayer, Lorenz+ (MPIM, CERN)
ALBERI 79 PL 83B 247 +Alvear, Castelli, Poropat+ (TRST, CERN, IFRJ)
EVANGELISTA 79 NP B153 253 + (BARI, BONN, CERN, DARE, GLAS, LIVP+)
EVANGELISTA 79B NP B154 381 + (BARI, BONN, CERN, DARE, GLAS, LIVP+)
SAKAMOTO 79 NP B158 410 +Hashimoto, Sai, Yamamoto+ (INUS)
CARTER 78B NP B141 467 (LOQM)
PAVLOPO... 78 PL 72B 415 Pavlopoulos+(KARLK, KARLE, BASL, CERN, STOH, STRB)
BRUCKNER 77 PL 67B 222 +Granz, Ingham, Kilian+ (MPIH, HEIDP, CERN)
CARTER 77 PL 67B 117 +Coupland, Eisenhandler, Astbury+ (LOQM, RHEL) JP
ABASHIAN 76 PR D13 5 +Watson, Gelfand, Buttram+ (ILL, ANL, CHIC, ISU)
BRAUN 76 PL 60B 481 +Brick, Fridman, Gerber, Juillot, Maurer+ (STRB)
CHALOUPKA 76 PL 61B 487 + (CERN, LIVP, MONS, PADO, ROMA, TRST)
ALSTON-... 75 PRL 35 1685 Alston-Garnjost, Kenney, Pollard, Ross, Tripp+(LBL, MTHO)
D'ANDLAU 75 PL 58B 223 +Cohen-Ganouna, Laloum, Lutz, Petri (CDEF, PISA)
KALOGERO... 75 PRL 34 1047 Kalogeropoulos, Tzanakos (SYRA)
CARROLL 74 PRL 32 247 +Chiang, Kycia, Li, Mazur, Michael+ (BNL)
DONALD 73 NP B61 333 +Edwards, Gibbins, Briand, Duboc+ (LIVP, PARIS)
ALEXANDER 72 NP B45 29 +Bar-Nir, Benary, Dagan+ (TELA)
BENVENUTI 71 PRL 27 283 +Cline, Rutz, Reeder, Scherer (WISC)
CLINE 70 Preprint +English, Reeder (WISC)
ALLES-... 67B NC 50A 776 Alles-Borelli, French, Frisk+ (CERN, BONN) G
BETTINI 66 NC 42A 695 +Cresti, Limentani, Bertanza, Bigi+ (PADO, PISA)

OTHER RELATED PAPERS

TANIMORI 90 PR D41 744 +Ishimoto+ (KEK, INUS, KYOT, TOHOK, HIRO)
LIU 87 PRL 58 2288 +Kiu, Li (STON)
ARMSTRONG 86C PL B175 383 +Chu, Clement, Elinon+ (BNL, HOUS, PENN, RICE)
BRIDGES 86 PRL 56 211 +Brown+ (BLSU, BNL, CASE, COLU, UMD, SYRA)
BRIDGES 86C PRL 57 1534 +Daftari, Kalogeropoulos+ (SYRA) JP
DOVER 86 PRL 57 1207 + (BNL) JP
ANGELOPO... 85 PL 159B 210 Angelopoulos+ (ATHU, UCI, UNM, PENN, TEMP)
BODENKAMP 85 NP B255 717 +Fries, Behrend, Hesse+ (KARLK, KARLE, DESY)
AZOOZ 84 NP B244 277 +Butterworth (LOIC, RHEL, SACL, SLAC, TOHOK+)

$X(1900\text{–}3600)$

OMITTED FROM SUMMARY TABLE

NOTE ON THE $X(1900\text{–}3600)$ REGION

The high-mass region is covered nearly continuously with evidence for peaks of various widths having various decay modes. As a satisfactory grouping into particles is not yet possible, we list all the $Y = 0$ bumps coupled neither to $\overline{N}N$ nor to e^+e^-, and having $M > 1900$ MeV, together, ordered by increasing mass.

The narrow peaks observed in a missing-mass-spectrometer experiment at 1929, 2195, and 2382 MeV, called respectively S, T, and U by the authors (CHIKOVANI 66, FOCACCI 66), were not seen by ANTIPOV 72, who performed a similar experiment at 25 and 40 GeV/c.

$X(1900\text{–}3600)$ MASSES AND WIDTHS

We do not use the following data for averages, fits, limits, etc.

VALUE (MeV)	*DOCUMENT ID*
1900 to 3600 OUR LIMIT	

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1870.0±40.0	[2] ALDE	86D	GAM4	0	100 $\pi^- p \to 2\eta X$
250.0±30.0	[2] ALDE	86D	GAM4	0	100 $\pi^- p \to 2\eta X$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1898±18	100	THOMPSON	74	HBC	+	13 $\pi^+ p \to 2\rho X$
108^{+41}_{-27}	100	THOMPSON	74	HBC	+	13 $\pi^+ p \to 2\rho X$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1900± 40	100	BOESEBECK	68	HBC	+	8 $\pi^+ p \to \pi^+\pi^0 X$
216±105	100	BOESEBECK	68	HBC	+	8 $\pi^+ p \to \pi^+\pi^0 X$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1901±13	ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$
312±61	ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1929±14	FOCACCI	66	MMS	−	3–12 $\pi^- p$
22± 2	FOCACCI	66	MMS	−	3–12 $\pi^- p$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1970±10	CHLIAPNIK...	80	HBC	0	32 $K^+ p \to 2K^0_S 2\pi X$
40±20	CHLIAPNIK...	80	HBC	0	32 $K^+ p \to 2K^0_S 2\pi X$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1973.0±15.0	30	CASO	70	HBC	−	11.2 $\pi^- p \to \rho 2\pi$
80.0	30	CASO	70	HBC	−	11.2 $\pi^- p \to \rho 2\pi$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2070	50	TAKAHASHI	72	HBC	8 $\pi^- p \to N 2\pi$
160	50	TAKAHASHI	72	HBC	8 $\pi^- p \to N 2\pi$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2103 ±50	586	[1] BISELLO	89B	DM2		$J/\psi \to 4\pi\gamma$
187 ±75	586	[1] BISELLO	89B	DM2		$J/\psi \to 4\pi\gamma$
2100.0±40.0		[3] ALDE	86D	GAM4	0	100 $\pi^- p \to 2\eta X$
250.0±40.0		[3] ALDE	86D	GAM4	0	100 $\pi^- p \to 2\eta X$

[1] Estimated by us from various fits.

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2141.0±12.0	389	GREEN	86	MPSF	400 $pA \to 4K X$
49.0±28.0	389	GREEN	86	MPSF	400 $pA \to 4K X$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2190.0±10.0	CLAYTON	67	HBC	±	2.5 $\overline{p}p \to a_2, \omega$