Neutrinos – THIS IS PART 4 OF 4

To reduce the size of this section's PostScript file, we have divided it into four PostScript files. We present the following index:

PART 1

PART 2

PART 3

PART 4

(H) Accelerator neutrino appearance experiments

$\nu_e \rightarrow \nu_\tau$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 9	90	USHIDA	86C	EMUL	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<44	90	TALEBZADEH	87	HLBC	BEBC

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.25	90	[168] USHIDA	86C	EMUL	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.36	90	TALEBZADEH	87	HLBC	BEBC

[168] USHIDA 86C published result is $\sin^2 2\theta < 0.12$. The quoted result is corrected for a numerical mistake incurred in calculating the expected number of ν_e CC events, normalized to the total number of neutrino interactions (3886) rather than to the total number of ν_μ CC events (1870).

$\overline{\nu}_e \rightarrow \overline{\nu}_\tau$

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.7	90	[169] FRITZE	80	HYBR	BEBC CERN SPS

[169] Authors give P($\nu_e \rightarrow \nu_\tau$) <0.35, equivalent to above limit.

$\nu_\mu \rightarrow \nu_e$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.09	90	ANGELINI	86	HLBC	BEBC CERN PS
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.9	90	VILAIN	94C	CHM2	CERN SPS
<0.1	90	BLUMENFELD	89	CNTR	
<1.3	90	AMMOSOV	88	HLBC	SKAT at Serpukhov
<0.19	90	BERGSMA	88	CHRM	
		[170] LOVERRE	88	RVUE	
<2.4	90	AHRENS	87	CNTR	BNL AGS
<1.8	90	BOFILL	87	CNTR	FNAL
<2.2	90	[171] BRUCKER	86	HLBC	15-ft FNAL
<0.43	90	AHRENS	85	CNTR	BNL AGS E734
<0.20	90	BERGSMA	84	CHRM	
<1.7	90	ARMENISE	81	HLBC	GGM CERN PS
<0.6	90	BAKER	81	HLBC	15-ft FNAL
<1.7	90	ERRIQUEZ	81	HLBC	BEBC CERN PS
<1.2	95	BLIETSCHAU	78	HLBC	GGM CERN PS
<1.2	95	BELLOTTI	76	HLBC	GGM CERN PS

[170] LOVERRE 88 reports a less stringent, indirect limit based on theoretical analysis of neutral to charged current ratios.
[171] 15ft bubble chamber at FNAL.

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 2.5	90	AMMOSOV	88	HLBC	SKAT at Serpukhov
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 9.4	90	VILAIN	94C	CHM2	CERN SPS
< 5.6	90	[172] VILAIN	94C	CHM2	CERN SPS
< 16	90	BLUMENFELD	89	CNTR	
< 8	90	BERGSMA	88	CHRM	$\Delta(m^2) \geq 30$ eV^2
		[173] LOVERRE	88	RVUE	
< 10	90	AHRENS	87	CNTR	BNL AGS
< 15	90	BOFILL	87	CNTR	FNAL
< 20	90	[174] ANGELINI	86	HLBC	BEBC CERN PS
20 to 40		[175] BERNARDI	86B	CNTR	$\Delta(m^2)$=5–10
< 11	90	[176] BRUCKER	86	HLBC	15-ft FNAL
< 3.4	90	AHRENS	85	CNTR	BNL AGS E734
<240	90	BERGSMA	84	CHRM	
< 10	90	ARMENISE	81	HLBC	GGM CERN PS
< 6	90	BAKER	81	HLBC	15-ft FNAL
< 10	90	ERRIQUEZ	81	HLBC	BEBC CERN PS
< 4	95	BLIETSCHAU	78	HLBC	GGM CERN PS
< 10	95	BELLOTTI	76	HLBC	GGM CERN PS

[172] VILAIN 94C limit derived by combining the ν_μ and $\overline{\nu}_\mu$ data assuming *CP* conservation.

[173] LOVERRE 88 reports a less stringent, indirect limit based on theoretical analysis of neutral to charged current ratios.

[174] ANGELINI 86 limit reaches 13×10^{-3} at $\Delta(m^2) \approx 2$ eV^2.

[175] BERNARDI 86B is a typical fit to the data, assuming mixing between two species. As the authors state, this result is in conflict with earlier upper bounds on this type of neutrino oscillations.

[176] 15ft bubble chamber at FNAL.

$\overline{\nu}_\mu \rightarrow \overline{\nu}_e$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.14	90	[177] FREEDMAN	93	CNTR	LAMPF
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.05–0.08	90	[178] ATHANASSO...	96	LSND	LAMPF
0.048–0.090	80	[179] ATHANASSO...	95		
<0.07	90	[180] HILL	95		
<0.9	90	VILAIN	94C	CHM2	CERN SPS
<3.1	90	BOFILL	87	CNTR	FNAL
<2.4	90	TAYLOR	83	HLBC	15-ft FNAL
<0.91	90	[181] NEMETHY	81B	CNTR	LAMPF
<1	95	BLIETSCHAU	78	HLBC	GGM CERN PS

[177] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$. FREEDMAN 93 replaces DURKIN 88.

[178] ATHANASSOPOULOS 96 is a search for $\overline{\nu}_e$ 30 m from LAMPF beam stop. Neutrinos originate mainly from π^+ decay at rest. $\overline{\nu}_e$ could come from either $\overline{\nu}_\mu \rightarrow \overline{\nu}_e$ or

$\nu_e \rightarrow \overline{\nu}_e$; our entry assumes the first interpretation. They are detected through $\overline{\nu}_e p \rightarrow e^+ n$ (20 MeV $< E_{e^+} <$ 60 MeV) in delayed coincidence with $np \rightarrow d\gamma$. Authors observe 51 $\pm$ 20 $\pm$ 8 total excess events over an estimated background 12.5 $\pm$ 2.9. ATHANASSOPOULOS 96B is a shorter version of this paper.

[179] ATHANASSOPOULOS 95 error corresponds to the 1.6σ band in the plot. The expected background is 2.7 $\pm$ 0.4 events. Corresponds to an oscillation probability of $(0.34^{+0.20}_{-0.18} \pm 0.07)\%$. For a different interpretation, see HILL 95. Replaced by ATHANASSOPOULOS 96.

[180] HILL 95 is a report by one member of the LSND Collaboration, reporting a different conclusion from the analysis of the data of this experiment (see ATHANASSOPOULOS 95). Contrary to the rest of the LSND Collaboration, Hill finds no evidence for the neutrino oscillation $\overline{\nu}_\mu \rightarrow \overline{\nu}_e$ and obtains only upper limits.

[181] In reaction $\overline{\nu}_e p \rightarrow e^+ n$.

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.004	95	BLIETSCHAU	78	HLBC	GGM CERN PS
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.0062 \pm 0.0024 \pm 0.0010$		[182] ATHANASSO...	96	LSND	LAMPF
0.003–0.012	80	[183] ATHANASSO...	95		
<0.006	90	[184] HILL	95		
<4.8	90	VILAIN	94C	CHM2	CERN SPS
<5.6	90	[185] VILAIN	94C	CHM2	CERN SPS
<0.024	90	[186] FREEDMAN	93	CNTR	LAMPF
<0.04	90	BOFILL	87	CNTR	FNAL
<0.013	90	TAYLOR	83	HLBC	15-ft FNAL
<0.2	90	[187] NEMETHY	81B	CNTR	LAMPF

[182] ATHANASSOPOULOS 96 reports (0.31 $\pm$ 0.12 $\pm$ 0.05)% for the oscillation probability; the value of $\sin^2 2\theta$ for large $\Delta(m^2)$ should be twice this probability. See footnote in preceeding table for further details, and see the paper for a plot showing allowed regions.

[183] ATHANASSOPOULOS 95 error corresponds to the 1.6σ band in the plot. The expected background is 2.7 $\pm$ 0.4 events. Corresponds to an oscillation probability of $(0.34^{+0.20}_{-0.18} \pm 0.07)\%$. For a different interpretation, see HILL 95. Replaced by ATHANASSOPOULOS 96.

[184] HILL 95 is a report by one member of the LSND Collaboration, reporting a different conclusion from the analysis of the data of this experiment (see ATHANASSOPOULOS 95). Contrary to the rest of the LSND Collaboration, Hill finds no evidence for the neutrino oscillation $\overline{\nu}_\mu \rightarrow \overline{\nu}_e$ and obtains only upper limits.

[185] VILAIN 94C limit derived by combining the ν_μ and $\overline{\nu}_\mu$ data assuming *CP* conservation.

[186] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$. FREEDMAN 93 replaces DURKIN 88.

[187] In reaction $\overline{\nu}_e p \rightarrow e^+ n$.

$\nu_\mu(\overline{\nu}_\mu) \rightarrow \nu_e(\overline{\nu}_e)$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.075	90	BORODOV...	92	CNTR	BNL E776

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<3	90	BORODOV...	92	CNTR	BNL E776
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.8	90	[188] MCFARLAND	95	CCFR	FNAL

[188] MCFARLAND 95 state that "This result is the most stringent to date for 250< $\Delta(m^2)$ <450 ev^2 and also excludes at 90%CL much of the high $\Delta(m^2)$ region favored by the recent LSND observation." See ATHANASSOPOULOS 95 and ATHANASSOPOULOS 96.

$\nu_\mu \rightarrow \nu_\tau$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 0.9	90	USHIDA	86C	EMUL	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.4	90	MCFARLAND	95	CCFR	FNAL
< 4.5	90	BATUSOV	90B	EMUL	FNAL
<10.2	90	BOFILL	87	CNTR	FNAL
< 6.3	90	BRUCKER	86	HLBC	15-ft FNAL
< 4.6	90	ARMENISE	81	HLBC	GGM CERN SPS
< 3	90	BAKER	81	HLBC	15-ft FNAL
< 6	90	ERRIQUEZ	81	HLBC	BEBC CERN SPS
< 3	90	USHIDA	81	EMUL	FNAL

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.004	90	USHIDA	86C	EMUL	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0081	90	MCFARLAND	95	CCFR	FNAL
<0.06	90	BATUSOV	90B	EMUL	FNAL
<0.34	90	BOFILL	87	CNTR	FNAL
<0.088	90	BRUCKER	86	HLBC	15-ft FNAL
<0.11	90	BALLAGH	84	HLBC	15-ft FNAL
<0.017	90	ARMENISE	81	HLBC	GGM CERN SPS
<0.06	90	BAKER	81	HLBC	15-ft FNAL
<0.05	90	ERRIQUEZ	81	HLBC	BEBC CERN SPS
<0.013	90	USHIDA	81	EMUL	FNAL

$\overline{\nu}_\mu \rightarrow \overline{\nu}_\tau$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<2.2	90	ASRATYAN	81	HLBC	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.4	90	MCFARLAND	95	CCFR	FNAL
<6.5	90	BOFILL	87	CNTR	FNAL
<7.4	90	TAYLOR	83	HLBC	15-ft FNAL

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<4.4 $\times 10^{-2}$	90	ASRATYAN	81	HLBC	FNAL
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0081	90	MCFARLAND	95	CCFR	FNAL
<0.15	90	BOFILL	87	CNTR	FNAL
<8.8 $\times 10^{-2}$	90	TAYLOR	83	HLBC	15-ft FNAL

$\nu_\mu(\overline{\nu}_\mu) \rightarrow \nu_\tau(\overline{\nu}_\tau)$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.5	90	[189] GRUWE	93	CHM2	CERN SPS

[189] GRUWE 93 is a search using the CHARM II detector in the CERN SPS wide-band neutrino beam for $\nu_\mu \rightarrow \nu_\tau$ and $\overline{\nu}_\mu \rightarrow \overline{\nu}_\tau$ oscillations signalled by quasi-elastic ν_τ and $\overline{\nu}_\tau$ interactions followed by the decay $\tau \rightarrow \nu_\tau \pi$. The maximum sensitivity in $\sin^2 2\theta$ ($< 6.4 \times 10^{-3}$ at the 90% CL) is reached for $\Delta(m^2) \simeq 50$ eV^2.

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<8	90	[190] GRUWE	93	CHM2	CERN SPS

[190] GRUWE 93 is a search using the CHARM II detector in the CERN SPS wide-band neutrino beam for $\nu_\mu \rightarrow \nu_\tau$ and $\overline{\nu}_\mu \rightarrow \overline{\nu}_\tau$ oscillations signalled by quasi-elastic ν_τ and $\overline{\nu}_\tau$ interactions followed by the decay $\tau \rightarrow \nu_\tau \pi$. The maximum sensitivity in $\sin^2 2\theta$ ($< 6.4 \times 10^{-3}$ at the 90% CL) is reached for $\Delta(m^2) \simeq 50$ eV^2.

$\nu_e \rightarrow (\overline{\nu}_e)_L$

This is a limit on lepton family-number violation and total lepton-number violation. $(\overline{\nu}_e)_L$ denotes a hypothetical left-handed $\overline{\nu}_e$. The bound is quoted in terms of $\Delta\ (m^2)$, $\sin(2\theta)$, and α, where α denotes the fractional admixture of $(V{+}A)$ charged current.

$\alpha\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.14	90	[191] FREEDMAN	93	CNTR	LAMPF
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<7	90	[192] COOPER	82	HLBC	BEBC CERN SPS

[191] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$.

[192] COOPER 82 states that existing bounds on V+A currents require α to be small.

$\alpha^2\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.032	90	[193] FREEDMAN	93	CNTR	LAMPF
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.05	90	[194] COOPER	82	HLBC	BEBC CERN SPS

[193] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$.

[194] COOPER 82 states that existing bounds on V+A currents require α to be small.

$\nu_\mu \rightarrow (\overline{\nu}_e)_L$

See note above for $\nu_e \rightarrow (\overline{\nu}_e)_L$ limit

$\alpha\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	CL%	DOCUMENT ID		TECN	COMMENT
<0.16	90	[195] FREEDMAN	93	CNTR	LAMPF
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.7	90	[196] COOPER	82	HLBC	BEBC CERN SPS

[195] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$. The limit on $\Delta(m^2)$ is better than the CERN BEBC experiment, but the limit on $\sin^2\theta$ is almost a factor of 100 less sensitive.

[196] COOPER 82 states that existing bounds on V+A currents require α to be small.

$\alpha^2\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.001	90	[197] COOPER	82	HLBC	BEBC CERN SPS
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.07	90	[198] FREEDMAN	93	CNTR	LAMPF

[197] COOPER 82 states that existing bounds on V+A currents require α to be small.

[198] FREEDMAN 93 is a search at LAMPF for $\overline{\nu}_e$ generated from any of the three neutrino types ν_μ, $\overline{\nu}_\mu$, and ν_e which come from the beam stop. The $\overline{\nu}_e$'s would be detected by the reaction $\overline{\nu}_e p \rightarrow e^+ n$. The limit on $\Delta(m^2)$ is better than the CERN BEBC experiment, but the limit on $\sin^2\theta$

(I) Disappearance experiments with accelerator & radioactive source neutrinos

$\nu_e \not\rightarrow \nu_e$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	CL%	DOCUMENT ID		TECN	COMMENT
< 0.17	90	[199] BAHCALL	95	THEO	

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

<40	90	[200] BORISOV	96	CNTR	IHEP-JINR detector
<14.9	90	BRUCKER	86	HLBC	15-ft FNAL
< 8	90	BAKER	81	HLBC	15-ft FNAL
<56	90	DEDEN	81	HLBC	BEBC CERN SPS
<10	90	ERRIQUEZ	81	HLBC	BEBC CERN SPS
<2.3 OR >8	90	NEMETHY	81B	CNTR	LAMPF

[199] BAHCALL 95 analyzed the GALLEX ^{51}Cr source experiment (ANSELMANN 95). They also gave a 95% CL limit of < 0.19 eV^2.

[200] BORISOV 96 exclusion curve extrapolated to obtain this value; however, it does not have the right curvature in this region.

$\sin^2(2\theta)$ for "Large" $\Delta(m^2)$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7 × 10^{-2}	90	[201] ERRIQUEZ	81	HLBC	BEBC CERN SPS
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.115	90	[202] BORISOV	96	CNTR	$\Delta(m^2) = 175$ eV^2
<0.38	90	[203] BAHCALL	95	THEO	^{51}Cr source
<0.54	90	BRUCKER	86	HLBC	15-ft FNAL
<0.6	90	BAKER	81	HLBC	15-ft FNAL
<0.3	90	[201] DEDEN	81	HLBC	BEBC CERN SPS

[201] Obtained from a Gaussian centered in the unphysical region.

[202] BORISOV 96 sets less stringent limits at large $\Delta(m^2)$, but exclusion curve does not have clear asymptotic behavior.

[203] BAHCALL 95 analyzed the GALLEX ^{51}Cr calibration source experiment (ANSELMANN 95). They also gave a 95% CL limit of < 0.45.

$\nu_\mu \not\to \nu_\mu$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

These experiments also allow sufficiently large $\Delta(m^2)$.

VALUE (eV^2)	CL%	DOCUMENT ID		TECN	COMMENT
<0.23 OR >1500 OUR LIMIT					
<0.23 OR >100	90	DYDAK	84	CNTR	
<13 OR >1500	90	STOCKDALE	84	CNTR	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 0.29 OR >22	90	BERGSMA	88	CHRM	
<7	90	BELIKOV	85	CNTR	Serpukhov
<8.0 OR >1250	90	STOCKDALE	85	CNTR	
<0.29 OR >22	90	BERGSMA	84	CHRM	
<8.0	90	BELIKOV	83	CNTR	

$\sin^2(2\theta)$ for $\Delta(m^2) = 100$eV^2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.02	90	[204] STOCKDALE	85	CNTR	FNAL

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

<0.17	90	[205] BERGSMA	88	CHRM	
<0.07	90	[206] BELIKOV	85	CNTR	Serpukhov
<0.27	90	[205] BERGSMA	84	CHRM	CERN PS
<0.1	90	[207] DYDAK	84	CNTR	CERN PS
<0.02	90	[208] STOCKDALE	84	CNTR	FNAL
<0.1	90	[209] BELIKOV	83	CNTR	Serpukhov

[204] This bound applies for $\Delta(m^2) = 100$ eV^2. Less stringent bounds apply for other $\Delta(m^2)$; these are nontrivial for $8 < \Delta(m^2) < 1250$ eV^2.

[205] This bound applies for $\Delta(m^2) = 0.7$–9. eV^2. Less stringent bounds apply for other $\Delta(m^2)$; these are nontrivial for $0.28 < \Delta(m^2) < 22$ eV^2.

[206] This bound applies for a wide range of $\Delta(m^2) > 7$ eV^2. For some values of $\Delta(m^2)$, the value is less stringent; the least restrictive, nontrivial bound occurs approximately at $\Delta(m^2) = 300$ eV^2 where $\sin^2(2\theta) < 0.13$ at CL = 90%.

[207] This bound applies for $\Delta(m^2) = 1.$–10. eV^2. Less stringent bounds apply for other $\Delta(m^2)$; these are nontrivial for $0.23 < \Delta(m^2) < 90$ eV^2.

[208] This bound applies for $\Delta(m^2) = 110$ eV^2. Less stringent bounds apply for other $\Delta(m^2)$; these are nontrivial for $13 < \Delta(m^2) < 1500$ eV^2.

[209] Bound holds for $\Delta(m^2) = 20$–1000 eV^2.

$\overline{\nu}_\mu \not\to \overline{\nu}_\mu$

$\Delta(m^2)$ for $\sin^2(2\theta) = 1$

VALUE (eV^2)	*CL%*	*DOCUMENT ID*		*TECN*
<7 OR >1200 OUR LIMIT				
<7 OR >1200	90	STOCKDALE	85	CNTR

$\sin^2(2\theta)$ for 190 eV^2 $< \Delta(m^2) <$ 320 eV^2

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.02	90	[210] STOCKDALE	85	CNTR	FNAL

[210] This bound applies for $\Delta(m^2)$ between 190 and 320 or = 530 eV^2. Less stringent bounds apply for other $\Delta(m^2)$; these are nontrivial for $7 < \Delta(m^2) < 1200$ eV^2.

REFERENCES FOR Searches for Massive Neutrinos and Lepton Mixing

ALLISON	97	PL B391 491	+Alner, Ayres, Barrett+	(Soudan 2 Collab.)
ALSTON-...	97	PR C55 474	Alston-Garnjost, Dougherty+	(LBL, MTHO, UNM, INEL)
GUENTHER	97	PR D55 54	+Hellmig+	(MPIH, KIAE, SASSO)
ACCIARRI	96G	PL B377 304	+Adam, Adriani, Aguilar-Benitez+	(L3 Collab.)
ALESSAND...	96B	NPBPS 48 238	Alessandrello, Brofferio, Bucci+	(MILA, SASSO)
ALEXANDER	96P	PL B385 433	+Allison, Altekamp, Ametewee+	(OPAL Collab.)
ATHANASSO...	96	PR C54 2685	Athanassopoulos, Auerbach, Burman+	(LSND Collab.)
ATHANASSO...	96B	PRL 77 3082	Athanassopoulos, Auerbach, Burman+	(LSND Collab.)
BALYSH	96	PRL 77 5186	+De Silva, Lebedev, Lou, Moe+	(KIAE, UCI, CIT)
BORISOV	96	PL B369 39	+Chernichenko, Chukin, Goryachev+	(SERP, JINR)
BRYMAN	96	PR D53 558	+Numao	(TRIU)
BUSKULIC	96S	PL B384 439	+De Bonis, Decamp, Ghez+	(ALEPH Collab.)
DAR	96	APJ 468 933	+Shavia	(HAIF)
FUKUDA	96	PRL 77 1683	+Hayakawa, Inoue, Ishihara+	(Kamiokande Collab.)
FUKUDA	96B	PL B388 397	+Hayakawa, Inoue, Ishihara+	(Kamiokande Collab.)
GREENWOOD	96	PR D53 6054	+Kropp, Mandelkern, Nakamura+	(UCI, SVR, SCUC)
HAMPEL	96	PL B388 384	+Heusser, Kiko, Kirsten+	(GALLEX Collab.)
TAKAOKA	96	PR C53 1557	+Motomura, Nagao	(KYUSH, OKAY)
WIETFELDT	96	PRPL 273 149	+Norman	(LBL)
ACHKAR	95	NP B434 503	+Aleksan+	(SING, SACLD, CPPM, CDEF, LAPP)
AHLEN	95	PL B357 481	+Ambrosio, Antolini, Auriemma+	(MACRO Collab.)

ANSELMANN	95	PL B342 440	+Fockenbrock, Hampel, Heusser+	(GALLEX Collab.)
ANSELMANN	95B	PL B357 237	+Hampel, Heusser, Kike+	(GALLEX Collab.)
ARMBRUSTER	95	PL B348 19	+Blair, Bodmann, Booth+	(KARMEN Collab.)
ARNOLD	95	JETPL 61 170	+Caurier, Guyonnet, Linck+	(NEMO Collab.)
		Translated from ZETFP 61 168.		
ATHANASSO...	95	PRL 75 2650	Athanassopoulos, Auerbach+	(LSND Collab.)
BAHCALL	95	PL B348 121	+Krastev, Lisi	(IAS)
BAHCALL	95B	RMP 67 781	+Pinsonneault	(IAS, OSU)
BAHRAN	95	PL B354 481	+Kalbfleisch	(OKLA)
BALYSH	95	PL B356 450	+Beck, Belyaev+	(MPIH, KIAE, SASSO)
BARABASH	95	PL B345 408	+Avignone+	(ITEP, SCUC, PNL, MINN, LEBD)
BILGER	95	PL B363 41	+Clement, Denig, Fohl+	(TUBIN, KARLE, PSI)
BURACHAS	95	PAN 58 153	+Danevich, Zdesenko, Kobychev+	(KIEV)
		Translated from YAF 58 195.		
DANEVICH	95	PL B344 72	+Georgadze, Kobychev, Kropivyansky+	(KIEV)
DASSIE	95	PR D51 2090	+Eschbach, Hubert, Isaac, Isac+	(NEMO Collab.)
DAUM	95	ZPHY C66 417	+Rhode, Bareyre, Barloutaud+	(FREJUS Collab.)
DAUM	95B	PL B361 179	+Frosch, Hajdas, Janousch+	(PSI, VIRG)
EJIRI	95	JPSJ 64 339	+Fushmii, Hazama, Kawasaki+	(OSAK, KIEV)
FARGION	95	PR D52 1828	+Khlopov, Konplich, Mignani	(ROMA, KIAM, MPEI)
GALLAS	95	PR D52 6	+Abolins, Brock, Cobau+	(MSU, FNAL, MIT, FLOR)
GEORGADZE	95	PAN 58 1093		
		Translated from YAF 58 1170.		
HAGNER	95	PR D52 1343	+Altmann, Feilitzsch, Oberauer+	(MUNT, LAPP, CPPM)
HIDDEMANN	95	JP G21 639	+Daniel, Schwentker	(MUNT)
HILL	95	PRL 75 2654		(PENN)
KOBAYASHI	95	NP A586 457	+Kobayashi	(KEK, SAGA)
MCFARLAND	95	PRL 75 3993	+Naples, Arroyo, Auchinchloss+	(CCFR Collab.)
VILAIN	95C	PL B351 387	+Wilquet, Petrak+	(CHARM II Collab.)
Also	95	PL B343 453	Vilain, Wilquet+	(CHARM II Collab.)
VYRODOV	95	JETPL 61 163	+Kozlov, Martem'yanov, Machulin+	(KIAE, LAPP, CDEF)
		Translated from ZETFP 61 161.		
WIETFELDT	95	PR C52 1028	+Norman+	(LBL, UCB, SPAUL, IND, TENN)
ABDURASHI...	94	PL B328 234	Abdurashitov, Faizov, Gavrin, Gusev+	(SAGE Collab.)
ACKER	94	PL B320 320	+Pakvasa	(HAWA)
ALESSAND...	94	PL B335 519	Alessandrello, Brofferio, ..., Fiorini+	(MILA)
ARPESELLA	94	EPL 27 29	+Barabash, Bellotti+	(SASSO, ITEP, MOSU, MILA, LEBD)
BAHCALL	94	PL B338 276		(IAS)
BALYSH	94	PL B322 176	+Beck, Belyaev, Bensch+	(MPIH, KIAE, SASSO)
BECK	94	PL B336 141	+Bensch, Bockholt+	(MPIH, KIAE, SASSO)
FUKUDA	94	PL B335 237	+Hayakawa, Inoue, Ishida+	(Kamiokande Collab.)
KONOPLICH	94	PAN 57 425	+Khlopov	(MPEI)
PDG	94	PR D50 1173	Montanet+	(CERN, LBL, BOST, IFIC+)
PIEPKE	94	NP A577 493	+..., Klapdor-Kleingrothaus+	(MPIH, ITEP)
SMIRNOV	94	PR D49 1389	+Spergel, Bahcall	(IAS, ICTP, INRM, PRIN)
VIDYAKIN	94	JETPL 59 390	+Vyrodov, Kozlov+	(KIAE)
		Translated from ZETFP 59 364.		
VILAIN	94C	ZPHY C64 539	+Wilquet, Beyer+	(CHARM II Collab.)
ALSTON-...	93	PRL 71 831	Alston-Garnjost+	(LBL, MTHO, UNM, INEL)
ARTEMEV	93	JETPL 58 262	+Brakhman, Zeldofich, Karelin+	(ITEP, INRM)
		Translated from ZETFP 58 256.		
BAHCALL	93	PR D47 1298	+Bethe	(IAS, CORN)
BAHRAN	93	PR D47 R754	+Kalbfleisch	(OKLA)
BAHRAN	93B	PR D47 R759	+Kalbfleisch	(OKLA)
BARANOV	93	PL B302 336	+Batusov, Bunyatov, Klimov+	(JINR, SERP, BUDA)
BERMAN	93	PR C48 R1	+Pitt, Calaprice, Lowry	(PRIN)
BERNATOW...	93	PR C47 806	Bernatowicz, Brazzle, Cowsik+	(WUSL, TATA)
FREEDMAN	93	PR D47 811	+Fujikawa, Napolitano, Nelson+	(LAMPF E645 Collab.)
GRUWE	93	PL B309 463	+Mommaert, Vilain, Wilquet+	(CHARM II Collab.)
HAMPEL	93	JPG 19 S209		(MPIH)
KALBFLEISCH	93	PL B303 355	+Bahran	(OKLA)
KAWASHIMA	93	PR C47 R2452	+Takahashi, Masuda	(TOKYC, RIKEN)
MORTARA	93	PRL 70 394	+Ahmad, Coulter, Freedman+	(ANL, LBL, UCB)
OHSHIMA	93	PR D47 4840	+	(KEK, TUAT, RIKEN, SCUC, ROCH, TSUK, INUS)
TURCK-CHI...	93	PRPL 230 57	Turck-Chieze+	(SACLD, USC, NICEA, NICEO, MEUD)
TURCK-CHI...	93B	APJ 408 347	Turck-Chieze, Lopez	(SACLD)
VUILLEUMIER	93	PR D48 1009	+Busto, Farine, Jorgens+	(NEUC, CIT, VILL)
WIETFELDT	93	PRL 70 1759	+Chan, da Cruz, Garcia+	(LBL, UCB, SPAUL)
ABREU	92B	PL B274 230	+Adams, Adami, Adye+	(DELPHI Collab.)
ADRIANI	92I	PL B295 371	+Aguilar-Benitez, Ahlen, Akbari, Alcaraz+	(L3 Collab.)
ARTEMJEV	92	PL B280 159	+Brakchman, Ivanovsky, Karelin+	(ITEP)
BAHCALL	92	RMP 64 885	+Pinsonneault	(IAS, YALE)

BAHRAN	92	PL B291 336	+Kalbfleisch	(OKLA)
BALYSH	92	PL B283 32	+Belyaev, Bockholt, Demehin+	(MPIH, KIAE, SASSO)
BECKER-SZ...	92	PRL 69 1010	Becker-Szendy, Bratton, Casper, Dye+	(IMB Collab.)
BECKER-SZ...	92B	PR D46 3720	Becker-Szendy, Bratton, Casper, Dye+	(IMB Collab.)
BEIER	92	PL B283 446	+Frank, Frati, Kim, Mann+	(KAM2 Collab.)
Also	94	PTRSL A346 63	Beier, Frank	(PENN)
BERNATOW...	92	PRL 69 2341	Bernatowicz, Brannon, Brazzle, Cowsik+	(WUSL, TATA)
BLUM	92	PL B275 506	+Busto, Campagne, Dassie, Hubert+	(NEMO Collab.)
BORODOV...	92	PRL 68 274	Borodovsky, Chi, Ho, Kondakis, Lee+	(COLU, JHU, ILL)
BRITTON	92	PRL 68 3000	+Ahmad, Bryman, Burnham+	(TRIU, CARL)
Also	94	PR D49 28	Britton, Ahmad, Bryman+	(TRIU, CARL)
BRITTON	92B	PR D46 R885	+Ahmad, Bryman+	(TRIU, CARL)
CHEN	92	PRL 69 3151	+Imel, Radcliffe, Henrickson, Boehm	(CIT)
ELLIOTT	92	PR C46 1535	+Hahn, Moe+	(UCI)
HIRATA	92	PL B280 146	+Inoue, Ishida+	(Kamiokande II Collab.)
HOLZSCHUH	92B	PL B287 381	+Fritschi, Kuendig	(ZURI)
KAWAKAMI	92	PL B287 45	+	(INUS, KEK, SCUC, TUAT, RIKEN, ROCH, TSUK)
KETOV	92	JETPL 55 564	+Machulin, Mikaelyan+	(KIAE)
		Translated from ZETFP 55 544.		
KUDOMI	92	PR C46 R2132	+Ejiri, Nagata, Okada, Shibata+	(OSAK, INUS)
MORI	92B	PL B289 463	+Hikasa, Nojiri, Oyama+	(KAM2 Collab.)
REUSSER	92	PR D45 2548	Reussser, Treichel, Boehm+	(CIT, NEUC, VILL)
ABAZOV	91B	PRL 67 3332	+Anosov, Faizov+	(SAGE Collab.)
ABREU	91F	NP B367 511	+Adam, Adami, Adye, Akesson+	(DELPHI Collab.)
ALEXANDER	91F	ZPHY C52 175	+Allison, Allport, Anderson, Arcelli+	(OPAL Collab.)
AVIGNONE	91	PL B256 559	+Brodzinski, Guerard+	(SCUC, PNL, ITEP, YERE)
BELLOTTI	91	PL B266 193	+Cremonesi, Fiorini, Gervasio+	(MILA, INFN)
CASPER	91	PRL 66 2561	+Becker-Szendy, Bratton, Cady+	(IMB Collab.)
DELEENER-...	91	PR D43 3611	De Leener-Rosier, Deutsch+	(LOUV, ZURI, LAUS)
EJIRI	91	PL B258 17	+Fushimi, Kamada, Kinoshita+	(OSAK)
GARCIA	91	PRL 67 3654	+Adelberger, Magnus, Swanson+	(WASH, CERN, LBL)
HIME	91	PL B257 441	+Jelley	(OXF)
HIRATA	91	PRL 66 9	+Inoue, Kajita, Kihara+	(Kamiokande II Collab.)
MANUEL	91	JP G17 S221		(MISSR)
MORALES	91	NC 104A 1581	+Morales, Nunez-Lagos, Puimedon+	(ZARA)
NORMAN	91	JPG 17 S291	+Sur, Lesko+	(LBL)
REUSSER	91	PL B255 143	+Treichel, Boehm, Broggini+	(NEUC, CIT, PSI)
SATO	91	PR D44 2220	+Hirata, Kajita, Kifune, Kihara+	(Kamioka Collab.)
SUHONEN	91	NP A535 509	+Khadkikar, Faessler	(JYV, AHMED, TUBIN)
TURKEVICH	91	PRL 67 3211	+Economou, Cowan	(CHIC, LANL)
WONG	91	PRL 67 1218	+Boehm, Fisher, Gabathuler+	(CIT, VILL, NEUC)
YOU	91	PL B265 53	+Zhu, Lu+	(BHEP, CAST+)
ADEVA	90S	PL B251 321	+Adriani, Aguilar-Benitez, Akbari+	(L3 Collab.)
AKRAWY	90L	PL B247 448	+Alexander, Allison, Allport+	(OPAL Collab.)
BARABASH	90	PL B249 186	+Kopylov, Cherehovsky	(ITEP, INRM)
BATUSOV	90B	ZPHY C48 209	+Bunyatov, Kuznetsov, Pozharova+	(JINR, ITEP, SERP)
BERGER	90B	PL B245 305	+Froehlich, Moench, Nisius+	(FREJUS Collab.)
BURCHAT	90	PR D41 3542	+King, Abrams, Adolphsen+	(Mark II Collab.)
DECAMP	90F	PL B236 511	+Deschizeaux, Lees, Minard+	(ALEPH Collab.)
FILIPPONE	90	PL B246 546	+Vogel	(CIT)
HIRATA	90	PRL 65 1297	+Inoue, Kajita+	(Kamiokande II Collab.)
JUNG	90	PRL 64 1091	+Van Kooten, Abrams, Adolphsen+	(Mark II Collab.)
KOPEIKIN	90	JETPL 51 86	+Mikazlyan, Fayans	(KIAE)
		Translated from ZETFP 51 75.		
MILEY	90	PRL 65 3092	+Avignone, Brodzinski, Collar, Reeves	(SCUC, PNL)
STAUDT	90	EPL 13 31	+Muto, Klapdor-Kleingrothaus	(MPIH)
VASENKO	90	MPL A5 1299	+Kirpichnikov, Kuznetsov, Starostin	(ITEP, YERE)
VIDYAKIN	90	JETP 71 424	+Vyrodov, Gurevich, Koslov+	(KIAE)
		Translated from ZETF 98 764.		
ABRAMS	89C	PRL 63 2447	+Adolphsen, Averill, Ballam+	(Mark II Collab.)
AGLIETTA	89	EPL 8 611	+Battistoni, Bellotti+	(FREJUS Collab.)
ALSTON-...	89	PRL 63 1671	Alston-Garnjost, Dougherty+	(LBL, MTHO, UNM, INEL)
BAHCALL	89	Neutrino Astrophysics, Cambridge Univ. Press		(IAS)
BARABASH	89	PL B223 273	+Kuzminov, Lobashev, Novikov+	(ITEP, INRM)
BELLOTTI	89	PL B221 209	+Cremonesi, Fiorini, Gervasio+	(MILA)
BLUMENFELD	89	PRL 62 2237	+Chi, Chichura, Chien+	(COLU, ILL, JHU)
DANEVICH	89	JETPL 49 476	+Zdesenko, Nikolaiko, Tretyak	(UZINR)
		Translated from ZETFP 49 417.		

DAVIS	89	ARNPS 39 467	+Mann, Wolfenstein	(BNL, PENN, CMU)
ENQVIST	89	NP B317 647	+Kainulainen, Maalampi	(HELS)
FISHER	89	PL B218 257	+Boehm, Bovet, Egger+	(CIT, NEUC, PSI)
MUTO	89	ZPHY A334 187	+Bender, Klapdor	(TINT, MPIH)
OYAMA	89	PR D39 1481	+Hirata, Kajita, Kifune+	(Kamiokande II Collab.)
SHAW	89	PRL 63 1342	+Blanis, Bodek, Budd+	(AMY Collab.)
AFONIN	88	JETP 67 213	+Ketov, Kopeikin, Mikaelyan+	(KIAE)
		Translated from ZETF 94 1, issue 2.		
AKERLOF	88	PR D37 577	+Chapman, Errede, Ken+	(HRS Collab.)
AMMOSOV	88	ZPHY C40 487	+Belikov+	(SKAT Collab.)
BAHCALL	88	RMP 60 297	+Ulrich	(IAS, UCLA)
BERGSMA	88	ZPHY C40 171	+Dorenbosch, Nieuwenhuis+	(CHARM Collab.)
BERNARDI	88	PL B203 332	+Carugno, Chauveau+	(PARIN, CERN, INFN, ATEN)
BIONTA	88	PR D38 768	+Blewitt, Bratton, Casper+	(IMB Collab.)
CALDWELL	88	PRL 61 510	+Eisberg, Grumm, Witherell+	(UCSB, UCB, LBL)
DURKIN	88	PRL 61 1811	+Harper, Ling+	(OSU, ANL, CIT, LBL, LSU, LANL)
ENGEL	88	PR C37 731	+Vogel, Zimbene	
LOVERRE	88	PL B206 711		(INFN)
MORALES	88	NC 100A 525	+Morales, Nunez-Lagos, Puimedon+	(ZARA)
OLIVE	88	PL B205 553	+Srednicki	(MINN, UCSB)
SREDNICKI	88	NP B310 693	+Watkins, Olive	(MINN, UCSB)
TURCK-CHI...	88	APJ 335 415	Turck-Chieze, Cahen, Casse, Doom	(SACL, BRUX)
AFONIN	87	JETPL 45 257	+Bogatov, Vershinskii+	(KIAE)
		Translated from ZETFP 45 201.		
AHLEN	87	PL B195 603	+Avignone, Brodzinski+	(BOST, SCUC, HARV, CHIC)
AHRENS	87	PR D36 702	+ (BNL, BROW, UCI, HIRO, KEK, OSAK, PENN, STON)	
BELLOTTI	87	EPL 3 889	+Cattadori, Cremonesi, Fiorini+	(MILA)
BOEHM	87	Massive Neutrinos	+Vogel	(CIT)
Cambridge Univ.		Press, Cambridge		
BOFILL	87	PR D36 3309	+Busza, Eldridge+	(MIT, FNAL, MSU)
CALDWELL	87	PRL 59 419	+Eisberg, Grumm, Witherell+	(UCSB, LBL)
DAUM	87	PR D36 2624	+Kettle, Jost+	(SIN, VIRG)
GRIEST	87	NP B283 681	+Seckel	(UCSC, CERN)
Also	88	NP B296 1034 erratum	Griest, Seckel	(UCSC, CERN)
LOSECCO	87	PL B184 305	+Bionta, Blewitt, Bratton+	(IMB Collab.)
MISHRA	87	PRL 59 1397	+Auchincloss+	(COLU, CIT, FNAL, CHIC, ROCH)
OBERAUER	87	PL B198 113	+von Feilitzsch, Mossbauer	(MUNT)
TALEBZADEH	87	NP B291 503	+Guy, Venus+	(BEBC WA66 Collab.)
TOMODA	87	PL B199 475	+Faessler	(TUBIN)
VIDYAKIN	87	JETP 66 243	+Vyrodov, Gurevich, Kozlov+	(KIAE)
		Translated from ZETF 93 424.		
WENDT	87	PRL 58 1810	+Abrams, Amidei, Baden+	(Mark II Collab.)
AFONIN	86	JETPL 44 142	+Bogatov, Borovoi, Vershinskii+	(KIAE)
		Translated from ZETFP 44 111.		
ANGELINI	86	PL B179 307	+Apostolakis, Baldini+	(PISA, ATHU, PADO, WISC)
AZUELOS	86	PRL 56 2241	+Britton, Bryman+	(TRIU, CNRC)
BADIER	86	ZPHY C31 21	+Bemporad, Boucrot, Callot+	(NA3 Collab.)
BELLOTTI	86	NC 95A 1	+Cremonesi, Fiorini, Liguori+	(MILA)
BERNARDI	86	PL 166B 479	+Carugno+	(CURIN, INFN, CDEF, ATEN, CERN)
BERNARDI	86B	PL B181 173	+Carugno+	(CURIN, INFN, CDEF, ATEN, CERN)
BORGE	86	PS 34 591	+DeRujula, Hansen, Jonson+	(ISOLDE Collab.)
BRUCKER	86	PR D34 2183	+Jacques, Kalelkar, Koller+	(RUTG, BNL, COLU)
DELEENER-...	86	PL B177 228	DeLeener-Rosier, Deutsch+	(LOUV, ZURI, LAUS)
DORENBOS...	86	PL 166B 473	Dorenbosch, Allaby, Amaldi+	(CHARM Collab.)
GROTZ	86	NC C9 535	+Klapdor	(MPIH)
USHIDA	86C	PRL 57 2897	+Kondo, Tasaka, Park, Song+	(FNAL E531 Collab.)
ZACEK	86	PR D34 2621	+Feilitzsch+	(CIT-SIN-TUM Collab.)
AFONIN	85	JETPL 41 435	+Borovoi, Dobrynin+	(KIAE)
		Translated from ZETFP 41 355.		
Also	85B	JETPL 42 285	Afonin, Bogatov, Borovoi, Dobrynin+	(KIAE)
		Translated from ZETFP 42 230.		
AHRENS	85	PR D31 2732	+Aronson+	(BNL, BROW, KEK, OSAK, PENN+)
ALBRECHT	85I	PL 163B 404	+Binder, Drescher, Schubert+	(ARGUS Collab.)
ALTZITZOG...	85	PRL 55 799	Altzitzoglou, Calaprice, Dewey+	(PRIN)
APALIKOV	85	JETPL 42 289	+Boris, Golutvin, Laptin, Lubimov+	(ITEP)
		Translated from ZETFP 42 233.		
BELIKOV	85	SJNP 41 589	+Volkov, Kochetkov, Mukhin+	(SERP)
		Translated from YAF 41 919.		

COOPER-...	85	PL 160B 207	Cooper-Sarkar+	(CERN, LOIC, OXF, SACL+)
COWSIK	85	PL 151B 62		(TATA)
DATAR	85	Nature 318 547	+Baba, Bhattacherjee, Bhuinya, Roy	(BHAB, TATA)
HUBERT	85	NC 85A 19	+Leccia, Dassie, Mennrath+	(BCEN, ZARA)
MARKEY	85	PR C32 2215	+Boehm	(CIT)
OHI	85	PL 160B 322	+Nakajima, Tamura+	(TOKY, INUS, KEK)
SIMPSON	85	PRL 54 1891		(GUEL)
STOCKDALE	85	ZPHY C27 53	+Bodek+	(ROCH, CHIC, COLU, FNAL)
ZACEK	85	PL 164B 193	+Zacek, Boehm+	(MUNI, CIT, SIN)
BALLAGH	84	PR D30 2271	+Bingham+	(UCB, LBL, FNAL, HAWA, WASH, WISC)
BERGSMA	84	PL 142B 103	+Dorenbosch, Allaby, Abt+	(CHARM Collab.)
CAVAIGNAC	84	PL 148B 387	+Hoummada, Koang+	(ISNG, LAPP)
DYDAK	84	PL 134B 281	+Feldman+	(CERN, DORT, HEIDH, SACL, WARS)
FORSTER	84	PL 138B 301	+Kwon, Markey, Boehm, Henrikson	(CIT)
FREESE	84	NP B233 167	+Schramm	(CHIC, FNAL)
GABATHULER	84	PL 138B 449	+Boehm+	(CIT, SIN, MUNI)
HAXTON	84	PPNP 12 409	+Stevenson	
MINEHART	84	PRL 52 804	+Ziock, Marshall, Stephens, Daum+	(VIRG, SIN)
SCHRAMM	84	PL 141B 337	+Steigman	(FNAL, BART)
STOCKDALE	84	PRL 52 1384	+Bodek+	(ROCH, CHIC, COLU, FNAL)
AFONIN	83	JETPL 38 436	+Bogatov, Borovoi, Vershinskii+	(KIAE)
		Translated from ZETFP 38 361.		
AVIGNONE	83	PRL 50 721	+Brodzinski, Brown, Evans, Hensley+	(SCUC, PNL)
BELENKII	83	JETPL 38 493	+Dobrynin, Zemlyakov, Mikaelyan+	(KIAE)
		Translated from ZETFP 38 406.		
BELIKOV	83	JETPL 38 661	+Volkov, Kochetkov, Mukhin, Sviridov+	(SERP)
		Translated from ZETFP 38 547.		
BERGSMA	83	PL 122B 465	+Dorenbosch, Jonker+	(CHARM Collab.)
BERGSMA	83B	PL 128B 361	+Dorenbosch+	(CHARM Collab.)
BRYMAN	83B	PRL 50 1546	+Dubois, Numao, Olaniya, Olin+	(TRIU, CNRC)
Also	83	PRL 50 7	Bryman, Dubois, Numao, Olaniya+	(TRIU, CNRC)
DEUTSCH	83	PR D27 1644	+Lebrun, Prieels	(LOUV)
FILIPPONE	83	PRL 50 412	+Elwyn, Davids+	(ANL, CHIC, VALP)
GRONAU	83	PR D28 2762		(HAIF)
KIRSTEN	83	PRL 50 474	+Richter, Jessberger	(MPIH)
Also	83B	ZPHY 16 189	Kirsten, Richter, Jessberger	(MPIH)
SCHRECK...	83	PL 129B 265	Schreckenbach, Colvin+	(ISNG, ILLG)
TAYLOR	83	PR D28 2705	+Cence, Harris, Jones+	(HAWA, LBL, FNAL)
BAHCALL	82	RMP 54 767	+Huebner, Lubow+	(IAS, LANL, HPC, YALE, UCLA)
COOPER	82	PL 112B 97	+Guy, Michette, Tyndel, Venus	(RL)
FILIPPONE	82	APJ 253 393	+Schramm	(ANL, EFI)
FOWLER	82	A.I.P. 96 80		(CIT)
HAXTON	82	PR D25 2360	+Stephenson, Strottman	(LANL, PURD)
HAYANO	82	PRL 49 1305	+Taniguchi, Yamanaka+	(TOKY, KEK, TSUK)
OLIVE	82	PR D25 213	+Turner	(CHIC, UCSB)
VUILLEUMIER	82	PL 114B 298	+Boehm, Egger+	(CIT, SIN, MUNI)
ABELA	81	PL 105B 263	+Daum, Eaton, Frosch, Jost, Kettle, Steiner	(SIN)
ARMENISE	81	PL 100B 182	+Fogli-Muciaccia+	(BARI, CERN, MILA, LALO)
ASANO	81	PL 104B 84	+Hayano, Kikutani, Kurokawa+	(KEK, TOKY, INUS, OSAK)
Also	81	PR D24 1232	Shrock	(STON)
ASRATYAN	81	PL 105B 301	+Efremenko, Fedotov+	(ITEP, FNAL, SERP, MICH)
BAKER	81	PRL 47 1576	+Connolly, Kahn, Kirk, Murtagh+	(BNL, COLU)
Also	78	PRL 40 144	Cnops, Connolly, Kahn, Kirk+	(BNL, COLU)
BERNSTEIN	81	PL 101B 39	+Feinberg	(STEV, COLU)
BOLIEV	81	SJNP 34 787	+Butkevich, Zakidyshev, Makoev+	(INRM)
		Translated from YAF 34 1418.		
CALAPRICE	81	PL 106B 175	+Schreiber, Schneider+	(PRIN, IND)
DEDEN	81	PL 98B 310	+Grassler, Boeckmann, Mermikides+	(BEBC Collab.)
ERRIQUEZ	81	PL 102B 73	+Natali+	(BARI, BIRM, BRUX, EPOL, RHEL, SACL+)
HAXTON	81	PRL 47 153	+Stephenson, Strottman	(PURD, LASL)
KWON	81	PR D24 1097	+Boehm, Hahn, Henrikson+	(CIT, ISNG, MUNI)
NEMETHY	81B	PR D23 262	+	(YALE, LBL, LASL, MIT, SACL, SIN, CNRC, BERN)
SHROCK	81	PR D24 1232		(STON)
SHROCK	81B	PR D24 1275		(STON)
SILVERMAN	81	PRL 46 467	+Soni	(UCI, UCLA)
SIMPSON	81B	PR D24 2971		(GUEL)
USHIDA	81	PRL 47 1694	+	(AICH, FNAL, KOBE, SEOU, MCGI, NAGO, OSU+)
AVIGNONE	80	PR C22 594	+Greenwood	(SCUC)
BAHCALL	80	PRL 45 945	+Lubow, Huebner+	(IAS, LASL, YALE, LLL, UCLA)
Also	76	Science 191 264	Bahcall, Davis	(IAS, BNL)

BOEHM	80	PL 97B 310	+Cavaignac, Feilitzsch+	(ILLG, CIT, ISNG, MUNI)
FRITZE	80	PL 96B 427		(AACH3, BONN, CERN, LOIC, OXF, SACL)
REINES	80	PRL 45 1307	+Sobel, Pasierb	(UCI)
Also	59	PR 113 273	Reines, Cowan	(LASL)
Also	66	PR 142 852	Nezrick, Reines	(CASE)
Also	76	PRL 37 315	Reines, Gurr, Sobel	(UCI)
SHROCK	80	PL 96B 159		(STON)
DAVIS	79	PR C19 2259	+Vogel, Mann, Schenter	(CIT)
BLIETSCHAU	78	NP B133 205	+Deden, Hasert, Krenz+	(Gargamelle Collab.)
CROUCH	78	PR D18 2239	+Landecker, Lathrop, Reines+	(CASE, UCI, WITW)
MEYER	77	PL 70B 469	+Nguyen, Abrams+	(SLAC, LBL, NWES, HAWA)
VYSOTSKY	77	JETPL 26 188	+Dolgov, Zeldovich	(ITEP)
		Translated from ZETFP 26 200.		
BELLOTTI	76	LNC 17 553	+Cavalli, Fiorini, Rollier	(MILA)
SZALAY	76	AA 49 437	+Marx	(EOTV)
SZALAY	74	APAH 35 8	+Marx	(EOTV)
COWSIK	72	PRL 29 669	+McClelland	(UCB)
MARX	72	Nu Conf. Budapest	+Szalay	(EOTV)
GERSHTEIN	66	JETPL 4 120	+Zeldovich	(KIAM)
		Translated from ZETFP 4 189.		