SCALE LIMITS for Contact Interactions: $\Lambda(ee\mu\mu)$

Limits are for $\Lambda^{\pm}_{LL}$ only. For other cases, see each reference.

Λ^{+}_{LL}(TeV)	Λ^{-}_{LL}(TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>2.6	**>1.9**	95	[9,10] BUSKULIC	93Q	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
>1.3	>1.5	95	[10] BUSKULIC	93Q	ALEP	E_{cm}=88.25–94.25 GeV
>2.3	>2.0	95	HOWELL	92	TOPZ	E_{cm}=52–61.4 GeV
	>1.7	95	[11] KROHA	92	RVUE	
>2.5	>1.5	95	BEHREND	91C	CELL	E_{cm}=35–43 GeV
>1.6	>2.0	95	[12] ABE	90I	VNS	E_{cm}=50–60.8 GeV
>1.9	>1.0	95	KIM	89	AMY	E_{cm}=50–57 GeV
>2.3	>1.3	95	BRAUNSCH...	88D	TASS	E_{cm}=30–46.8 GeV
>4.4	>2.1	95	[13] BARTEL	86C	JADE	E_{cm}=12–46.8 GeV
>2.9	>0.86	95	[14] BERGER	85	PLUT	E_{cm}=34.7 GeV

[9] This BUSKULIC 93Q value is from ALEPH data plus PEP/PETRA/TRISTAN data reanalyzed by KROHA 92.

[10] BUSKULIC 93Q uses the following prescription to obtain the limit: when the naive 95%CL limit is better than the statistically expected sensitivity for the limit, the latter is adopted for the limit.

[11] KROHA 92 limit is from fit to BARTEL 86C, BEHREND 87C, BRAUNSCHWEIG 88D, BRAUNSCHWEIG 89C, ABE 90I, and BEHREND 91C. The fit gives $\eta/\Lambda^2_{LL} = -0.155 \pm 0.095$ TeV^{-2}.

[12] ABE 90I assumed m_Z =91.163 GeV and $\sin^2\theta_W = 0.231$.

[13] BARTEL 86C assumed m_Z = 93 GeV and $\sin^2\theta_W = 0.217$.

[14] BERGER 85 assumed m_Z = 93 GeV and $\sin^2\theta_W = 0.217$.

SCALE LIMITS for Contact Interactions: $\Lambda(ee\tau\tau)$

Limits are for $\Lambda^{\pm}_{LL}$ only. For other cases, see each reference.

Λ^{+}_{LL}(TeV)	Λ^{-}_{LL}(TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>1.9	**>2.9**	95	[15] KROHA	92	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
>1.0	>1.5	95	[16] BUSKULIC	93Q	ALEP	E_{cm}=88.25–94.25 GeV
>1.8	>2.3	95	[16,17] BUSKULIC	93Q	RVUE	
>1.9	>1.7	95	HOWELL	92	TOPZ	E_{cm}=52–61.4 GeV
>1.6	>2.3	95	BEHREND	91C	CELL	E_{cm}=35–43 GeV
>1.8	>1.3	95	[18] ABE	90I	VNS	E_{cm}=50–60.8 GeV
>2.2	>3.2	95	[19] BARTEL	86	JADE	E_{cm}=12–46.8 GeV

[15] KROHA 92 limit is from fit to BARTEL 86C BEHREND 89B, BRAUNSCHWEIG 89C, ABE 90I, and BEHREND 91C. The fit gives $\eta/\Lambda^2_{LL} = +0.095 \pm 0.120$ TeV^{-2}.

[16] BUSKULIC 93Q uses the following prescription to obtain the limit: when the naive 95%CL limit is better than the statistically expected sensitivity for the limit, the latter is adopted for the limit.

[17] This BUSKULIC 93Q value is from ALEPH data plus PEP/PETRA/TRISTAN data reanalyzed by KROHA 92.

[18] ABE 90I assumed m_Z =91.163 GeV and $\sin^2\theta_W = 0.231$.

[19] BARTEL 86 assumed m_Z = 93 GeV and $\sin^2\theta_W = 0.217$.

SCALE LIMITS for Contact Interactions: $\Lambda(\ell\ell\ell\ell)$

Lepton universality assumed. Limits are for $\Lambda^{\pm}_{LL}$ only. For other cases, see each reference.

Λ^{+}_{LL}(TeV)	Λ^{-}_{LL}(TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>3.5	**>2.8**	95	[20,21] BUSKULIC	93Q	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
>3.0	>2.3	95	[21,22] BUSKULIC	93Q	ALEP	E_{cm}=88.25–94.25 GeV
>2.5	>2.2	95	[23] HOWELL	92	TOPZ	E_{cm}=52–61.4 GeV
>3.4	>2.7	95	[24] KROHA	92	RVUE	

[20] This BUSKULIC 93Q value is from ALEPH data plus PEP/PETRA/TRISTAN data reanalyzed by KROHA 92.

[21] BUSKULIC 93Q uses the following prescription to obtain the limit: when the naive 95%CL limit is better than the statistically expected sensitivity for the limit, the latter is adopted for the limit.

[22] From $e^+e^- \rightarrow e^+e^-$, $\mu^+\mu^-$, and $\tau^+\tau^-$.

[23] HOWELL 92 limit is from $e^+e^- \rightarrow \mu^+\mu^-$ and $\tau^+\tau^-$.

[24] KROHA 92 limit is from fit to most PEP/PETRA/TRISTAN data. The fit gives $\eta/\Lambda^2_{LL} = -0.0200 \pm 0.0666$ TeV^{-2}.

SCALE LIMITS for Contact Interactions: $\Lambda(eeqq)$

Limits are for $\Lambda^{\pm}_{LL}$ only. For other cases, see each reference.

Λ^{+}_{LL}(TeV)	Λ^{-}_{LL}(TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>1.7	**>2.2**	95	[25] ABE	91D	CDF	$(eeqq)$ (isosinglet)
>1.2		95	[26] ADACHI	91	TOPZ	$(eeqq)$ (flavor-universal)
	>1.7	95	[27] ABE	89L	VNS	$(eeqq)$ (flavor-universal)
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	>1.6	95	[26] ADACHI	91	TOPZ	$(eeqq)$ (flavor-universal)
>0.6	>1.7	95	[28] BEHREND	91C	CELL	$(eecc)$
>1.1	>1.0	95	[28] BEHREND	91C	CELL	$(eebb)$
>0.9		95	[27] ABE	89L	VNS	$(eeqq)$ (flavor-universal)
>1.05	>1.61	95	[29] HAGIWARA	89	RVUE	$(eecc)$
>1.21	>0.53	95	[30] HAGIWARA	89	RVUE	$(eebb)$

[25] ABE 91D limits are from e^+e^- mass distribution in $p\overline{p} \rightarrow e^+e^-$ X at E_{cm} = 1.8 TeV.

[26] ADACHI 91 limits are from differential jet cross section. Universality of $\Lambda(eeqq)$ for five flavors is assumed.

[27] ABE 89L limits are from jet charge asymmetry. Universality of $\Lambda(eeqq)$ for five flavors is assumed.

[28] BEHREND 91C is from data at E_{cm} = 35–43 GeV.

[29] The HAGIWARA 89 limit is derived from forward-backward asymmetry measurements of D/D^* mesons by ALTHOFF 83C, BARTEL 84E, and BARINGER 88.

[30] The HAGIWARA 89 limit is derived from forward-backward asymmetry measurement of b hadrons by BARTEL 84D.

SCALE LIMITS for Contact Interactions: $\Lambda(\mu\mu qq)$

Λ^{+}_{LL}(TeV)	Λ^{-}_{LL}(TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>1.4	**>1.6**	95	ABE	92B	CDF	$(\mu\mu qq)$ (isosinglet)

SCALE LIMITS for Contact Interactions: $\Lambda(\ell\nu\ell\nu)$

VALUE (TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>3.10	90	[31] JODIDIO	86	SPEC	$\Lambda^{\pm}_{LR}(\nu_\mu\nu_e\mu e)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>3.8		[32] DIAZCRUZ	94	RVUE	$\Lambda^{+}_{LL}(\tau\nu_\tau e\nu_e)$
>8.1		[32] DIAZCRUZ	94	RVUE	$\Lambda^{-}_{LL}(\tau\nu_\tau e\nu_e)$
>4.1		[33] DIAZCRUZ	94	RVUE	$\Lambda^{+}_{LL}(\tau\nu_\tau \mu\nu_\mu)$
>6.5		[33] DIAZCRUZ	94	RVUE	$\Lambda^{-}_{LL}(\tau\nu_\tau \mu\nu_\mu)$

[31] JODIDIO 86 limit is from $\mu^+ \rightarrow \overline{\nu}_\mu e^+ \nu_e$. Chirality invariant interactions $L = (g^2/\Lambda^2)$ $[\eta_{LL}\ (\overline{\nu}_{\mu L}\gamma^\alpha\mu_L)\ (\overline{e}_L\gamma_\alpha\nu_{eL}) + \eta_{LR}\ (\overline{\nu}_{\mu L}\gamma^\alpha\nu_{eL}\ (\overline{e}_R\gamma_\alpha\mu_R)]$ with $g^2/4\pi = 1$ and $(\eta_{LL},\eta_{LR}) = (0,\pm1)$ are taken. No limits are given for $\Lambda^{\pm}_{LL}$ with $(\eta_{LL},\eta_{LR}) = (\pm1,0)$. For more general constraints with right-handed neutrinos and chirality nonconserving contact interactions, see their text.

[32] DIAZCRUZ 94 limits are from $\Gamma(\tau \rightarrow e\nu\nu)$ and assume flavor-dependent contact interactions with $\Lambda(\tau\nu_\tau e\nu_e) \ll \Lambda(\mu\nu_\mu e\nu_e)$.

[33] DIAZCRUZ 94 limits are from $\Gamma(\tau \rightarrow \mu\nu\nu)$ and assume flavor-dependent contact interactions with $\Lambda(\tau\nu_\tau \mu\nu_\mu) \ll \Lambda(\mu\nu_\mu e\nu_e)$.

SCALE LIMITS for Contact Interactions: $\Lambda(qqqq)$

Limits are for $\Lambda^{\pm}_{LL}$ with color-singlet isoscalar exchanges among u_L's and d_L's only. See EICHTEN 84 for details.

VALUE (TeV)	CL%	DOCUMENT ID		TECN	COMMENT
>1.4	95	[34] ABE	92D	CDF	$p\overline{p} \rightarrow$ jets inclusive
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>1.3	95	[35] ABE	93G	CDF	$p\overline{p} \rightarrow$ dijet mass
>1.0	99	[36] ABE	92M	CDF	$p\overline{p} \rightarrow$ dijet angl.
>0.825	95	[37] ALITTI	91B	UA2	$p\overline{p} \rightarrow$ jets inclusive
>0.700	95	[34] ABE	89	CDF	$p\overline{p} \rightarrow$ jets inclusive
>0.330	95	[38] ABE	89H	CDF	$p\overline{p} \rightarrow$ dijet angl.
>0.400	95	[39] ARNISON	86C	UA1	$p\overline{p} \rightarrow$ jets inclusive
>0.415	95	[40] ARNISON	86D	UA1	$p\overline{p} \rightarrow$ dijet angl.
>0.370	95	[41] APPEL	85	UA2	$p\overline{p} \rightarrow$ jets inclusive
>0.275	95	[42] BAGNAIA	84C	UA2	Repl. by APPEL 85

[34] Limit is from inclusive jet cross-section data in $p\overline{p}$ collisions at E_{cm} = 1.8 TeV. The limit takes into account uncertainties in choice of structure functions and in choice of process scale.

[35] ABE 93G limit is from dijet mass distribution in $p\overline{p}$ collisions at E_{cm} = 1.8 TeV. The limit is the weakest from several choices of structure functions and renormalization scale.

[36] ABE 92M limit is from dijet angular distribution for m_{dijet} >550 GeV in $p\overline{p}$ collisions at E_{cm}=1.8 TeV.

[37] ALITTI 91B limit is from inclusive jet cross section in $p\overline{p}$ collisions at E_{cm} = 630 GeV. The limit takes into account uncertainties in choice of structure functions and in choice of process scale.

[38] ABE 89H limit is from dijet angular distribution for m_{dijet} > 200 GeV at the Fermilab Tevatron Collider with E_{cm} = 1.8 TeV. The QCD prediction is quite insensitive to choice of structure functions and choice of process scale.

[39] ARNISON 86C limit is from the study of inclusive high-p_T jet distributions at the CERN $\overline{p}p$ collider (E_{cm} = 546 and 630 GeV). The QCD prediction renormalized to the low-p_T region gives a good fit to the data.

[40] ARNISON 86D limit is from the study of dijet angular distribution in the range 240 < m(dijet) < 300 GeV at the CERN $\overline{p}p$ collider (E_{cm} = 630 GeV). QCD prediction using EHLQ structure function (EICHTEN 84) with Λ_{QCD} = 0.2 GeV for the choice of $Q^2 = {p_T}^2$ gives the best fit to the data.

[41] APPEL 85 limit is from the study of inclusive high-p_T jet distributions at the CERN $\overline{p}p$ collider (E_{cm} = 630 GeV). The QCD prediction renormalized to the low-p_T region gives a good description of the data.

[42] BAGNAIA 84C limit is from the study of jet p_T and dijet mass distributions at the CERN $\overline{p}p$ collider (E_{cm} = 540 GeV). The limit suffers from the uncertainties in comparing the data with the QCD prediction.