

Technicolor

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The latest unpublished results are described in “Dynamical Electroweak Symmetry Breaking” review.

MASS LIMITS for Resonances in Models of Dynamical Electroweak Symmetry Breaking

VALUE (GeV)	CL%	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
>1140	95	¹ KHACHATRYAN 15C	CMS	$\rho_T \rightarrow WZ$
none 200–700, 750–890	95	² AAD	14AT ATLS	$\rho\rho \rightarrow \omega_T \rightarrow Z\gamma$
none 275–960	95	² AAD	14AT ATLS	$\rho\rho \rightarrow a_T \rightarrow W\gamma$
> 703		³ AAD	14V ATLS	color singlet techni-vector
> 494		⁴ AAD	13AN ATLS	$\rho\rho \rightarrow a_T \rightarrow W\gamma$
none 500–1740	95	⁵ AAD	13AN ATLS	$\rho\rho \rightarrow \omega_T \rightarrow Z\gamma$
>1300	95	⁶ AAD	13AQ ATLS	top-color Z'
>2100	95	⁷ CHATRCHYAN 13AP	CMS	top-color Z'
none 167–687	95	⁶ CHATRCHYAN 13BM	CMS	top-color Z'
> 805	95	⁸ BAAK	12 RVUE	QCD-like technicolor
> 805	95	⁹ CHATRCHYAN 12AF	CMS	$\rho_T \rightarrow WZ$
	95	⁶ AALTONEN	11AD CDF	top-color Z'
	95	⁶ AALTONEN	11AE CDF	top-color Z'
none 208–408	95	¹⁰ CHIVUKULA	11 RVUE	top-Higgs
		¹¹ CHIVUKULA	11A RVUE	techni- π
		¹² AALTONEN	10I CDF	$\rho\bar{\rho} \rightarrow \rho_T/\omega_T \rightarrow W\pi_T$
		¹³ ABAZOV	10A D0	$\rho_T \rightarrow WZ$
		¹⁴ ABAZOV	07I D0	$\rho\bar{\rho} \rightarrow \rho_T/\omega_T \rightarrow W\pi_T$
> 280	95	¹⁵ ABULENCIA	05A CDF	$\rho_T \rightarrow e^+e^-, \mu^+\mu^-$
> 207	95	¹⁶ CHEKANOV	02B ZEUS	color octet techni- π
none 90–206.7	95	¹⁷ ABAZOV	01B D0	$\rho_T \rightarrow e^+e^-$
		¹⁸ ABDALLAH	01 DLPH	$e^+e^- \rightarrow \rho_T$
		¹⁹ AFFOLDER	00F CDF	color-singlet techni- ρ , $\rho_T \rightarrow W\pi_T, 2\pi_T$
> 600	95	²⁰ AFFOLDER	00K CDF	color-octet techni- ρ , $\rho_{T8} \rightarrow 2\pi_{LQ}$
none 350–440	95	²¹ ABE	99F CDF	color-octet techni- ρ , $\rho_{T8} \rightarrow \bar{b}b$
none 260–480	95	²² ABE	99N CDF	techni- $\omega, \omega_T \rightarrow \gamma\bar{b}b$
		²³ ABE	97G CDF	color-octet techni- ρ , $\rho_{T8} \rightarrow 2\text{jets}$

¹ KHACHATRYAN 15C search for a vector techni-resonance decaying to WZ . The limit assumes $M_{\pi_T} = (3/4) M_{\rho_T} - 25$ GeV. See their Fig.3 for the limit in $M_{\pi_T} - M_{\rho_T}$ plane of the low scale technicolor model.

² AAD 14AT search for techni- ω and techni- a resonances decaying to $V\gamma$ with $V = W(\rightarrow \ell\nu)$ or $Z(\rightarrow \ell^+\ell^-)$.

- 3 AAD 14V search for vector techni-resonances decaying into electron or muon pairs in $p\bar{p}$ collisions at $\sqrt{s} = 8$ TeV. See their table IX for exclusion limits with various assumptions.
- 4 AAD 13AN search for vector techni-resonance a_T decaying into $W\gamma$.
- 5 AAD 13AN search for vector techni-resonance ω_T decaying into $Z\gamma$.
- 6 Search for top-color Z' decaying to $t\bar{t}$. The quoted limit is for $\Gamma_{Z'}/m_{Z'} = 0.012$.
- 7 CHATRCHYAN 13AP search for top-color leptophobic Z' decaying to $t\bar{t}$. The quoted limit is for $\Gamma_{Z'}/m_{Z'} = 0.012$.
- 8 BAAK 12 give electroweak oblique parameter constraints on the QCD-like technicolor models. See their Fig. 28.
- 9 CHATRCHYAN 12AF search for a vector techni-resonance decaying to WZ . The limit assumes $M_{\pi_T} = (3/4) M_{\rho_T} - 25$ GeV. See their Fig. 3 for the limit in $M_{\pi_T} - M_{\rho_T}$ plane of the low scale technicolor model.
- 10 Using the LHC limit on the Higgs boson production cross section, CHIVUKULA 11 obtain a limit on the top-Higgs mass > 300 GeV at 95% CL assuming 150 GeV top-pion mass.
- 11 Using the LHC limit on the Higgs boson production cross section, CHIVUKULA 11A obtain a limit on the technipion mass ruling out the region $110 \text{ GeV} < m_P < 2m_t$. Existence of color techni-fermions, top-color mechanism, and $N_{TC} \geq 3$ are assumed.
- 12 AALTONEN 10I search for the vector techni-resonances (ρ_T, ω_T) decaying into $W\pi_T$ with $W \rightarrow \ell\nu$ and $\pi_T \rightarrow b\bar{b}, b\bar{c},$ or $b\bar{u}$. See their Fig. 3 for the exclusion plot in $M_{\pi_T} - M_{\rho_T}$ plane.
- 13 ABAZOV 10A search for a vector techni-resonance decaying into WZ . The limit assumes $M_{\rho_T} < M_{\pi_T} + M_W$.
- 14 ABAZOV 07I search for the vector techni-resonances (ρ_T, ω_T) decaying into $W\pi_T$ with $W \rightarrow e\nu$ and $\pi_T \rightarrow b\bar{b}$ or $b\bar{c}$. See their Fig. 2 for the exclusion plot in $M_{\pi_T} - M_{\rho_T}$ plane.
- 15 ABULENCIA 05A search for resonances decaying to electron or muon pairs in $p\bar{p}$ collisions. at $\sqrt{s} = 1.96$ TeV. The limit assumes Technicolor-scale mass parameters $M_V = M_A = 500$ GeV.
- 16 CHEKANOV 02B search for color octet techni- π P decaying into dijets in $e p$ collisions. See their Fig. 5 for the limit on $\sigma(ep \rightarrow ePX) \cdot B(P \rightarrow 2j)$.
- 17 ABAZOV 01B searches for vector techni-resonances (ρ_T, ω_T) decaying to e^+e^- . The limit assumes $M_{\rho_T} = M_{\omega_T} < M_{\pi_T} + M_W$.
- 18 The limit is independent of the π_T mass. See their Fig. 9 and Fig. 10 for the exclusion plot in the $M_{\rho_T} - M_{\pi_T}$ plane. ABDALLAH 01 limit on the techni-pion mass is $M_{\pi_T} > 79.8$ GeV for $N_D=2$, assuming its point-like coupling to gauge bosons.
- 19 AFFOLDER 00F search for ρ_T decaying into $W\pi_T$ or $\pi_T\pi_T$ with $W \rightarrow \ell\nu$ and $\pi_T \rightarrow \bar{b}b, \bar{b}c$. See Fig. 1 in the above Note on "Dynamical Electroweak Symmetry Breaking" for the exclusion plot in the $M_{\rho_T} - M_{\pi_T}$ plane.
- 20 AFFOLDER 00K search for the ρ_{T8} decaying into $\pi_{LQ}\pi_{LQ}$ with $\pi_{LQ} \rightarrow b\nu$. For $\pi_{LQ} \rightarrow c\nu$, the limit is $M_{\rho_{T8}} > 510$ GeV. See their Fig. 2 and Fig. 3 for the exclusion plot in the $M_{\rho_{T8}} - M_{\pi_{LQ}}$ plane.
- 21 ABE 99F search for a new particle X decaying into $b\bar{b}$ in $p\bar{p}$ collisions at $E_{\text{cm}} = 1.8$ TeV. See Fig. 7 in the above Note on "Dynamical Electroweak Symmetry Breaking" for the upper limit on $\sigma(p\bar{p} \rightarrow X) \times B(X \rightarrow b\bar{b})$. ABE 99F also exclude top gluons of width $\Gamma=0.3M$ in the mass interval $280 < M < 670$ GeV, of width $\Gamma=0.5M$ in the mass interval $340 < M < 640$ GeV, and of width $\Gamma=0.7M$ in the mass interval $375 < M < 560$ GeV.
- 22 ABE 99N search for the techni- ω decaying into $\gamma\pi_T$. The technipion is assumed to decay $\pi_T \rightarrow b\bar{b}$. See Fig. 2 in the above Note on "Dynamical Electroweak Symmetry Breaking" for the exclusion plot in the $M_{\omega_T} - M_{\pi_T}$ plane.
- 23 ABE 97G search for a new particle X decaying into dijets in $p\bar{p}$ collisions at $E_{\text{cm}} = 1.8$ TeV. See Fig. 5 in the above Note on "Dynamical Electroweak Symmetry Breaking" for the upper limit on $\sigma(p\bar{p} \rightarrow X) \times B(X \rightarrow 2j)$.

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