

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The latest unpublished results are described in “Dynamical Electroweak Symmetry Breaking” review.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. ● ● ●				
>805	95	¹ AALTONEN	11AD CDF	top-color Z'
>805	95	¹ AALTONEN	11AE CDF	top-color Z'
		² CHIVUKULA	11 RVUE	top-Higgs
		³ CHIVUKULA	11A RVUE	techni- π
		⁴ AALTONEN	10I CDF	$\rho_{\mathcal{T}} \rightarrow \rho_{\mathcal{T}}/\omega_{\mathcal{T}} \rightarrow W\pi_{\mathcal{T}}$
none 208–408	95	⁵ ABAZOV	10A D0	$\rho_{\mathcal{T}} \rightarrow WZ$
		⁶ ABAZOV	07I D0	$\rho_{\mathcal{T}} \rightarrow \rho_{\mathcal{T}}/\omega_{\mathcal{T}} \rightarrow W\pi_{\mathcal{T}}$
>280	95	⁷ ABULENCIA	05A CDF	$\rho_{\mathcal{T}} \rightarrow e^+e^-, \mu^+\mu^-$
		⁸ CHEKANOV	02B ZEUS	color octet techni- π
>207	95	⁹ ABAZOV	01B D0	$\rho_{\mathcal{T}} \rightarrow e^+e^-$
none 90–206.7	95	¹⁰ ABDALLAH	01 DLPH	$e^+e^- \rightarrow \rho_{\mathcal{T}}$
		¹¹ AFFOLDER	00F CDF	color-singlet techni- ρ , $\rho_{\mathcal{T}} \rightarrow W\pi_{\mathcal{T}}, 2\pi_{\mathcal{T}}$
>600	95	¹² AFFOLDER	00K CDF	color-octet techni- ρ , $\rho_{\mathcal{T}8} \rightarrow 2\pi_{LQ}$
none 350–440	95	¹³ ABE	99F CDF	color-octet techni- ρ , $\rho_{\mathcal{T}8} \rightarrow \bar{b}b$
		¹⁴ ABE	99N CDF	techni- $\omega, \omega_{\mathcal{T}} \rightarrow \gamma\bar{b}b$
none 260–480	95	¹⁵ ABE	97G CDF	color-octet techni- ρ , $\rho_{\mathcal{T}8} \rightarrow 2\text{jets}$

¹ AALTONEN 11AD and AALTONEN 11AE search for top-color Z' decaying to $t\bar{t}$. The quoted limit is for Z'_{top} with decay width $\Gamma = 0.012 M_{Z'}$.

² 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.

³ Using the LHC limit on the Higgs boson production cross section, CHIVUKULA 11A obtain a limit on the technipion mass ruling out the region $110 \text{ GeV} < m_{\rho} < 2m_t$. Existence of color technifermions, top-color mechanism, and $N_{TC} \geq 3$ are assumed.

⁴ AALTONEN 10I search for the vector techni-resonances ($\rho_{\mathcal{T}}, \omega_{\mathcal{T}}$) decaying into $W\pi_{\mathcal{T}}$ with $W \rightarrow \ell\nu$ and $\pi_{\mathcal{T}} \rightarrow b\bar{b}, b\bar{c},$ or $b\bar{u}$. See their Fig. 3 for the exclusion plot in $M_{\pi_{\mathcal{T}}} - M_{\rho_{\mathcal{T}}}$ plane.

⁵ ABAZOV 10A search for a vector techni-resonance decaying into WZ . The limit assumes $M_{\rho_{\mathcal{T}}} < M_{\pi_{\mathcal{T}}} + M_W$.

⁶ ABAZOV 07I search for the vector techni-resonances ($\rho_{\mathcal{T}}, \omega_{\mathcal{T}}$) decaying into $W\pi_{\mathcal{T}}$ with $W \rightarrow e\nu$ and $\pi_{\mathcal{T}} \rightarrow b\bar{b}$ or $b\bar{c}$. See their Fig. 2 for the exclusion plot in $M_{\pi_{\mathcal{T}}} - M_{\rho_{\mathcal{T}}}$ plane.

- ⁷ 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.
- ⁸ CHEKANOV 02B search for color octet techni- π P decaying into dijets in $e p$ collisions. See their Fig. 5 for the limit on $\sigma(e p \rightarrow e P X) \cdot B(P \rightarrow 2j)$.
- ⁹ ABAZOV 01B searches for vector techni-resonances (ρ_T, ω_T) decaying to $e^+ e^-$. The limit assumes $M_{\rho_T} = M_{\omega_T} < M_{\pi_T} + M_W$.
- ¹⁰ 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.
- ¹¹ AFFOLDER 00F search for ρ_T decaying into $W \pi_T$ or $\pi_T \pi_T$ with $W \rightarrow \ell \nu$ and $\pi_T \rightarrow \bar{b} b, \bar{c} c$. 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.
- ¹² 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.
- ¹³ 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.
- ¹⁴ 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.
- ¹⁵ 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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