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MINIMAL SUPERSYMMETRIC STANDARD MODEL ASSUMPTIONS

All results shown below (except where stated otherwise) are based on the Minimal Supersymmetric Standard Model (MSSM) as described in the Note on Supersymmetry. This includes the assumption that R-parity is conserved. In addition the following assumptions are made in most cases:

1) The $\widetilde{\chi}^0_1$ (or $\widetilde{\gamma}$) is the lightest supersymmetric particle (LSP).
2) $m_{\widetilde{f}_L} = m_{\widetilde{f}_R}$ where $\widetilde{f}_L$ and $\widetilde{f}_R$ refer to the scalar partners of left-and right-handed fermions.

Limits involving different assumptions either are identified with comments or are in the miscellaneous section.

When needed, specific assumptions of the eigenstate content of neutralinos and charginos are indicated (use of the notation $\widetilde{\gamma}$ (photino), $\widetilde{H}$ (Higgsino), $\widetilde{W}$ (w-ino), and $\widetilde{Z}$ (z-ino) indicates the approximation of a pure state was made).

$\widetilde{\chi}^0_1$ (Lightest Neutralino) MASS LIMIT

$\widetilde{\chi}^0_1$ is likely to be the lightest supersymmetric particle (LSP). See also the $\widetilde{\chi}^0_2$, $\widetilde{\chi}^0_3$, $\widetilde{\chi}^0_4$ section below.

We have divided the $\widetilde{\chi}^0_1$ listings below into three sections: 1) Accelerator limits for $\widetilde{\chi}^0_1$, 2) Bounds on $\widetilde{\chi}^0_1$ from dark matter searches, and 3) Other bounds on $\widetilde{\chi}^0_1$ from astrophysics and cosmology.

Accelerator limits for $\widetilde{\chi}^0_1$

These papers generally exclude regions in the $M_2-\mu$ parameter plane based on accelerator experiments. Unless otherwise stated, these papers assume minimal supersymmetry and GUT relations (gaugino-mass unification condition).

VALUE (GeV)	CL%	DOCUMENT ID		TECN	COMMENT
>20	95	[1] DECAMP	92	ALEP	$\widetilde{\chi}^0_1$, $\tan\beta > 3$
>18.4	90	[2] HIDAKA	91	RVUE	$\widetilde{\chi}^0_1$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>18.8		[3] BAER	91	RVUE	$\widetilde{\chi}^0_1$; $\tan\beta > 1.6$
> (10–13)	90	[4] ROSZKOWSKI	90	RVUE	$\widetilde{\chi}^0_1$; $\tan\beta \geq 1$
>5 GeV	90	[5] HEARTY	89	ASP	$\widetilde{\gamma}$; for $m_{\widetilde{e}} <55$ GeV

[1] DECAMP 92 limit for $\tan\beta >2$ is $m>13$ GeV.
[2] HIDAKA 91 limit obtained from LEP and preliminary CDF results (as analyzed in BAER 91).
[3] BAER 91 limit obtained from LEP and preliminary CDF results assuming $\tan\beta > 1.6$.
[4] ROSZKOWSKI 90 limit obtained from ALEPH and CDF/UA2 results assuming $\tan\beta \geq 1$.
[5] HEARTY 89 assumed pure $\widetilde{\gamma}$ eigenstate and $m_{\widetilde{e}_L} = m_{\widetilde{e}_R}$. There is no limit for $m_{\widetilde{e}} >58$ GeV. Uses $e^+e^- \rightarrow \gamma\widetilde{\gamma}\widetilde{\gamma}$. No GUT relation assumptions are made.

Bounds on $\widetilde{\chi}^0_1$ from dark matter searches

These papers generally exclude regions in the $M_2-\mu$ parameter plane assuming that $\widetilde{\chi}^0_1$ is the dominant form of dark matter in the galactic halo. These limits are based on the lack of detection in laboratory experiments or by the absence of a signal in underground neturino detectors. The latter signal is expected if $\widetilde{\chi}^0_1$ accumlates in the Sun or the Earth and annihilates into high-energy ν's.

VALUE	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
	[6] MORI	93	KAMI
	[7] BOTTINO	92	COSM
	[8] BOTTINO	91	RVUE
	[9] GELMINI	91	COSM
	[10] KAMIONKOW.	91	RVUE
	[11] MORI	91B	KAMI
none 4–15 GeV	[12] OLIVE	88	COSM