

ATLAS SUSY Searches* - 95% CL Lower Limits

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ATLAS Preliminary

$\sqrt{s} = 7, 8 \text{ TeV}$

| Model | e, μ, τ, γ | Jets | E_T^{miss} | $\int \mathcal{L} dt [\text{fb}^{-1}]$ | Mass limit | Reference |
|--|---|-----------------------|---------------------|--|------------|--|
| Inclusive Searches | MSUGRA/CMSSM | 0 | 2-6 jets | Yes | 20.3 | \tilde{q}, \tilde{g} 1.7 TeV |
| | MSUGRA/CMSSM | 1 e, μ | 3-6 jets | Yes | 20.3 | \tilde{g} 1.2 TeV |
| | MSUGRA/CMSSM | 0 | 7-10 jets | Yes | 20.3 | \tilde{g} 1.1 TeV |
| | $\tilde{q}\tilde{q}, \tilde{q} \rightarrow q\tilde{\chi}_1^0$ | 0 | 2-6 jets | Yes | 20.3 | \tilde{q} 850 GeV |
| | $\tilde{g}\tilde{g}, \tilde{g} \rightarrow q\tilde{q}\tilde{\chi}_1^0$ | 0 | 2-6 jets | Yes | 20.3 | \tilde{g} 1.33 TeV |
| | $\tilde{g}\tilde{g}, \tilde{g} \rightarrow q\tilde{q}\tilde{\chi}_1^\pm \rightarrow qqW^\pm\tilde{\chi}_1^0$ | 1 e, μ | 3-6 jets | Yes | 20.3 | \tilde{g} 1.18 TeV |
| | $\tilde{g}\tilde{g}, \tilde{g} \rightarrow qg(\ell\ell/\ell\nu/\nu\nu)\tilde{\chi}_1^0$ | 2 e, μ | 0-3 jets | - | 20.3 | \tilde{g} 1.12 TeV |
| | GMSB ($\tilde{\ell}$ NLSP) | 2 e, μ | 2-4 jets | Yes | 4.7 | \tilde{g} 1.24 TeV |
| | GMSB ($\tilde{\ell}$ NLSP) | 1-2 $\tau + 0-1 \ell$ | 0-2 jets | Yes | 20.3 | \tilde{g} 1.6 TeV |
| | GGM (bino NLSP) | 2 γ | - | Yes | 20.3 | \tilde{g} 1.28 TeV |
| | GGM (wino NLSP) | 1 $e, \mu + \gamma$ | - | Yes | 4.8 | \tilde{g} 619 GeV |
| | GGM (higgsino-bino NLSP) | γ | 1 b | Yes | 4.8 | \tilde{g} 900 GeV |
| 3 rd gen. \tilde{g} med. | $\tilde{g} \rightarrow b\tilde{b}\tilde{\chi}_1^0$ | 0 | 3 b | Yes | 20.1 | \tilde{g} 1.25 TeV |
| | $\tilde{g} \rightarrow t\tilde{t}\tilde{\chi}_1^0$ | 0 | 7-10 jets | Yes | 20.3 | \tilde{g} 1.1 TeV |
| | $\tilde{g} \rightarrow t\tilde{t}\tilde{\chi}_1^\pm$ | 0-1 e, μ | 3 b | Yes | 20.1 | \tilde{g} 1.34 TeV |
| | $\tilde{g} \rightarrow b\tilde{t}\tilde{\chi}_1^\pm$ | 0-1 e, μ | 3 b | Yes | 20.1 | \tilde{g} 1.3 TeV |
| | | | | | | |
| 3 rd gen. squarks direct production | $\tilde{b}_1\tilde{b}_1, \tilde{b}_1 \rightarrow b\tilde{\chi}_1^0$ | 0 | 2 b | Yes | 20.1 | \tilde{b}_1 100-620 GeV |
| | $\tilde{b}_1\tilde{b}_1, \tilde{b}_1 \rightarrow t\tilde{\chi}_1^\pm$ | 2 e, μ (SS) | 0-3 b | Yes | 20.3 | \tilde{b}_1 275-440 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (light), $\tilde{t}_1 \rightarrow b\tilde{\chi}_1^\pm$ | 1-2 e, μ | 1-2 b | Yes | 4.7 | \tilde{t}_1 110-167 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (light), $\tilde{t}_1 \rightarrow Wb\tilde{\chi}_1^0$ | 2 e, μ | 0-2 jets | Yes | 20.3 | \tilde{t}_1 130-210 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (medium), $\tilde{t}_1 \rightarrow t\tilde{\chi}_1^0$ | 2 e, μ | 2 jets | Yes | 20.3 | \tilde{t}_1 215-530 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (medium), $\tilde{t}_1 \rightarrow b\tilde{\chi}_1^\pm$ | 0 | 2 b | Yes | 20.1 | \tilde{t}_1 150-580 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (heavy), $\tilde{t}_1 \rightarrow t\tilde{\chi}_1^0$ | 1 e, μ | 1 b | Yes | 20 | \tilde{t}_1 210-640 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (heavy), $\tilde{t}_1 \rightarrow t\tilde{\chi}_1^\pm$ | 0 | 2 b | Yes | 20.1 | \tilde{t}_1 260-640 GeV |
| | $\tilde{t}_1\tilde{t}_1, \tilde{t}_1 \rightarrow c\tilde{\chi}_1^0$ | 0 | mono-jet/c-tag | Yes | 20.3 | \tilde{t}_1 90-240 GeV |
| | $\tilde{t}_1\tilde{t}_1$ (natural GMSB) | 2 e, μ (Z) | 1 b | Yes | 20.3 | \tilde{t}_1 150-580 GeV |
| | $\tilde{t}_2\tilde{t}_2, \tilde{t}_2 \rightarrow \tilde{t}_1 + Z$ | 3 e, μ (Z) | 1 b | Yes | 20.3 | \tilde{t}_2 290-600 GeV |
| | | | | | | |
| EW direct | $\tilde{\ell}_{L,R}\tilde{\ell}_{L,R}, \tilde{\ell} \rightarrow \ell\tilde{\chi}_1^0$ | 2 e, μ | 0 | Yes | 20.3 | $\tilde{\ell}$ 90-325 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_1^\pm, \tilde{\chi}_1^\pm \rightarrow \tilde{\ell}\nu(\ell\bar{\nu})$ | 2 e, μ | 0 | Yes | 20.3 | $\tilde{\chi}_1^\pm$ 140-465 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_1^\pm, \tilde{\chi}_1^\pm \rightarrow \tilde{\tau}\nu(\tau\bar{\nu})$ | 2 τ | - | Yes | 20.3 | $\tilde{\chi}_1^\pm$ 100-350 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_2^0 \rightarrow \tilde{\ell}_L\nu\tilde{\ell}_L(\bar{\nu}\nu), \ell\bar{\nu}\tilde{\ell}_L\ell(\bar{\nu}\nu)$ | 3 e, μ | 0 | Yes | 20.3 | $\tilde{\chi}_1^\pm, \tilde{\chi}_2^0$ 700 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_2^0 \rightarrow W\tilde{\chi}_1^0 Z\tilde{\chi}_1^0$ | 2-3 e, μ | 0 | Yes | 20.3 | $\tilde{\chi}_1^\pm, \tilde{\chi}_2^0$ 420 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_2^0 \rightarrow W\tilde{\chi}_1^0 h\tilde{\chi}_1^0$ | 1 e, μ | 2 b | Yes | 20.3 | $\tilde{\chi}_1^\pm, \tilde{\chi}_2^0$ 285 GeV |
| | $\tilde{\chi}_2^0\tilde{\chi}_3^0, \tilde{\chi}_{2,3}^0 \rightarrow \tilde{\ell}_R\ell$ | 4 e, μ | 0 | Yes | 20.3 | $\tilde{\chi}_{2,3}^0$ 620 GeV |
| | | | | | | |
| Long-lived particles | Direct $\tilde{\chi}_1^\pm\tilde{\chi}_1^\pm$ prod., long-lived $\tilde{\chi}_1^\pm$ | Disapp. trk | 1 jet | Yes | 20.3 | $\tilde{\chi}_1^\pm$ 270 GeV |
| | Stable, stopped \tilde{g} R-hadron | 0 | 1-5 jets | Yes | 27.9 | \tilde{g} 832 GeV |
| | GMSB, stable $\tilde{\tau}, \tilde{\chi}_1^0 \rightarrow \tilde{\tau}(\tilde{g}, \tilde{\mu}) + \tau(e, \mu)$ | 1-2 μ | - | - | 15.9 | $\tilde{\chi}_1^0$ 475 GeV |
| | GMSB, $\tilde{\chi}_1^0 \rightarrow \gamma\tilde{G}$, long-lived $\tilde{\chi}_1^0$ | 2 γ | - | Yes | 4.7 | $\tilde{\chi}_1^0$ 230 GeV |
| | $\tilde{q}\tilde{q}, \tilde{\chi}_1^0 \rightarrow qq\mu$ (RPV) | 1 μ , displ. vtx | - | - | 20.3 | \tilde{q} 1.0 TeV |
| RPV | LFV $pp \rightarrow \tilde{\nu}_\tau + X, \tilde{\nu}_\tau \rightarrow e + \mu$ | 2 e, μ | - | - | 4.6 | $\tilde{\nu}_\tau$ 1.61 TeV |
| | LFV $pp \rightarrow \tilde{\nu}_\tau + X, \tilde{\nu}_\tau \rightarrow e(\mu) + \tau$ | 1 $e, \mu + \tau$ | - | - | 4.6 | $\tilde{\nu}_\tau$ 1.1 TeV |
| | Billinear RPV CMSSM | 2 e, μ (SS) | 0-3 b | Yes | 20.3 | \tilde{q}, \tilde{g} 1.35 TeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_1^\pm, \tilde{\chi}_1^\pm \rightarrow W\tilde{\chi}_1^0, \tilde{\chi}_1^0 \rightarrow ee\tilde{\nu}_\mu, e\mu\tilde{\nu}_e$ | 4 e, μ | - | Yes | 20.3 | $\tilde{\chi}_1^\pm$ 750 GeV |
| | $\tilde{\chi}_1^\pm\tilde{\chi}_1^\pm, \tilde{\chi}_1^\pm \rightarrow W\tilde{\chi}_1^0, \tilde{\chi}_1^0 \rightarrow \tau\tau\tilde{\nu}_e, e\tau\tilde{\nu}_\tau$ | 3 $e, \mu + \tau$ | - | Yes | 20.3 | $\tilde{\chi}_1^\pm$ 450 GeV |
| | $\tilde{g} \rightarrow qq\tilde{q}$ | 0 | 6-7 jets | - | 20.3 | \tilde{g} 916 GeV |
| | $\tilde{g} \rightarrow \tilde{t}_1 t, \tilde{t}_1 \rightarrow bs$ | 2 e, μ (SS) | 0-3 b | Yes | 20.3 | \tilde{g} 850 GeV |
| | | | | | | |
| Other | Scalar gluon pair, sgluon $\rightarrow q\tilde{q}$ | 0 | 4 jets | - | 4.6 | sgluon 100-287 GeV |
| | Scalar gluon pair, sgluon $\rightarrow t\bar{t}$ | 2 e, μ (SS) | 2 b | Yes | 14.3 | sgluon 350-800 GeV |
| | WIMP interaction (D5, Dirac χ) | 0 | mono-jet | Yes | 10.5 | M^* scale 704 GeV |

*Only a selection of the available mass limits on new states or phenomena is shown. All limits quoted are observed minus 1σ theoretical signal cross section uncertainty.