

ATLAS Exotics Searches* - 95% CL Exclusion

Status: March 2015

ATLAS Preliminary

$$\int \mathcal{L} dt = (1.0 - 20.3) \text{ fb}^{-1} \quad \sqrt{s} = 7, 8 \text{ TeV}$$

Model		ℓ, γ	Jets	E_T^{miss}	$\int \mathcal{L} dt [\text{fb}^{-1}]$	Mass limit		Reference
Extra dimensions	ADD $G_{KK} + g/q$	–	$\geq 1 \text{ j}$	Yes	20.3	M_D	5.25 TeV	$n = 2$ 1502.01518
	ADD non-resonant $\ell\ell$	$2e, \mu$	–	–	20.3	M_S	4.7 TeV	$n = 3 \text{ HLZ}$ 1407.2410
	ADD QBH $\rightarrow \ell q$	$1e, \mu$	1 j	–	20.3	M_{th}	5.2 TeV	$n = 6$ 1311.2006
	ADD QBH	–	2 j	–	20.3	M_{th}	5.82 TeV	$n = 6$ 1407.1376
	ADD BH high N_{trk}	$2\mu \text{ (SS)}$	–	–	20.3	M_{th}	4.7 TeV	$n = 6, M_D = 3 \text{ TeV, non-rot BH}$ 1308.4075
	ADD BH high $\sum p_T$	$\geq 1e, \mu$	$\geq 2 \text{ j}$	–	20.3	M_{th}	5.8 TeV	$n = 6, M_D = 3 \text{ TeV, non-rot BH}$ 1405.4254
	ADD BH high multijet	–	$\geq 2 \text{ j}$	–	20.3	M_{th}	5.8 TeV	$n = 6, M_D = 3 \text{ TeV, non-rot BH}$ Preliminary
	RS1 $G_{KK} \rightarrow \ell\ell$	$2e, \mu$	–	–	20.3	$G_{KK} \text{ mass}$	2.68 TeV	$k/\overline{M}_{Pl} = 0.1$ 1405.4123
	RS1 $G_{KK} \rightarrow \gamma\gamma$	2γ	–	–	20.3	$G_{KK} \text{ mass}$	2.66 TeV	$k/\overline{M}_{Pl} = 0.1$ Preliminary
	Bulk RS $G_{KK} \rightarrow ZZ \rightarrow qq\ell\ell$	$2e, \mu$	$2 \text{ j} / 1 \text{ J}$	–	20.3	$G_{KK} \text{ mass}$	740 GeV	$k/\overline{M}_{Pl} = 1.0$ 1409.6190
	Bulk RS $G_{KK} \rightarrow WW \rightarrow qq\ell\nu$	$1e, \mu$	$2 \text{ j} / 1 \text{ J}$	Yes	20.3	$W' \text{ mass}$	700 GeV	$k/\overline{M}_{Pl} = 1.0$ 1503.04677
	Bulk RS $G_{KK} \rightarrow HH \rightarrow b\bar{b}b\bar{b}$	–	4 b	–	19.5	$G_{KK} \text{ mass}$	590-710 GeV	$k/\overline{M}_{Pl} = 1.0$ ATLAS-CONF-2014-005
	Bulk RS $g_{KK} \rightarrow t\bar{t}$	$1e, \mu$	$\geq 1 \text{ b}, \geq 1 \text{J}/2 \text{ j}$	Yes	20.3	$g_{KK} \text{ mass}$	2.2 TeV	BR = 0.925 ATLAS-CONF-2015-009
	2UED / RPP	$2e, \mu \text{ (SS)}$	$\geq 1 \text{ b}, \geq 1 \text{ j}$	Yes	20.3	$KK \text{ mass}$	960 GeV	Preliminary
Gauge bosons	SSM $Z' \rightarrow \ell\ell$	$2e, \mu$	–	–	20.3	$Z' \text{ mass}$	2.9 TeV	$g_V = 1$ 1405.4123
	SSM $Z' \rightarrow \tau\tau$	2τ	–	–	19.5	$Z' \text{ mass}$	2.02 TeV	1502.07177
	SSM $W' \rightarrow \ell\nu$	$1e, \mu$	–	Yes	20.3	$W' \text{ mass}$	3.24 TeV	1407.7494
	EGM $W' \rightarrow WZ \rightarrow \ell\nu\ell'\ell'$	$3e, \mu$	–	Yes	20.3	$W' \text{ mass}$	1.52 TeV	1406.4456
	EGM $W' \rightarrow WZ \rightarrow qq\ell\ell$	$2e, \mu$	$2 \text{ j} / 1 \text{ J}$	–	20.3	$W' \text{ mass}$	1.59 TeV	1409.6190
	HVT $W' \rightarrow WH \rightarrow \ell\nu b\bar{b}$	$1e, \mu$	2 b	Yes	20.3	$W' \text{ mass}$	1.47 TeV	Preliminary
	LRSM $W'_R \rightarrow t\bar{b}$	$1e, \mu$	$2 \text{ b}, 0-1 \text{ j}$	Yes	20.3	$W' \text{ mass}$	1.92 TeV	1410.4103
	LRSM $W'_R \rightarrow t\bar{b}$	$0e, \mu$	$\geq 1 \text{ b}, 1 \text{ J}$	–	20.3	$W' \text{ mass}$	1.76 TeV	1408.0886
CI	CI $qqqq$	–	2 j	–	17.3	Λ	12.0 TeV	$\eta_{LL} = -1$ Preliminary
	CI $qq\ell\ell$	$2e, \mu$	–	–	20.3	Λ	21.6 TeV	$\eta_{LL} = -1$ 1407.2410
	CI $uutt$	$2e, \mu \text{ (SS)}$	$\geq 1 \text{ b}, \geq 1 \text{ j}$	Yes	20.3	Λ	4.35 TeV	$ C_{LL} = 1$ Preliminary
DM	EFT D5 operator (Dirac)	$0e, \mu$	$\geq 1 \text{ j}$	Yes	20.3	M_*	974 GeV	at 90% CL for $m(\chi) < 100 \text{ GeV}$ 1502.01518
	EFT D9 operator (Dirac)	$0e, \mu$	$1 \text{ J}, \leq 1 \text{ j}$	Yes	20.3	M_*	2.4 TeV	at 90% CL for $m(\chi) < 100 \text{ GeV}$ 1309.4017
LQ	Scalar LQ 1 st gen	$2e$	$\geq 2 \text{ j}$	–	1.0	LQ mass	660 GeV	$\beta = 1$ 1112.4828
	Scalar LQ 2 nd gen	2μ	$\geq 2 \text{ j}$	–	1.0	LQ mass	685 GeV	$\beta = 1$ 1203.3172
	Scalar LQ 3 rd gen	$1e, \mu, 1\tau$	$1 \text{ b}, 1 \text{ j}$	–	4.7	LQ mass	534 GeV	$\beta = 1$ 1303.0526
Heavy quarks	VLQ $TT \rightarrow Ht + X, Wb + X$	$1e, \mu$	$\geq 1 \text{ b}, \geq 3 \text{ j}$	Yes	20.3	$T \text{ mass}$	785 GeV	isospin singlet T in (T,B) doublet 1409.5500
	VLQ $TT \rightarrow Zt + X$	$2/\geq 3e, \mu$	$\geq 2/\geq 1 \text{ b}$	–	20.3	$T \text{ mass}$	735 GeV	B in (B,Y) doublet 1409.5500
	VLQ $BB \rightarrow Zb + X$	$2/\geq 3e, \mu$	$\geq 2/\geq 1 \text{ b}$	–	20.3	$B \text{ mass}$	755 GeV	isospin singlet Preliminary
	VLQ $BB \rightarrow Wt + X$	$1e, \mu$	$\geq 1 \text{ b}, \geq 5 \text{ j}$	Yes	20.3	$B \text{ mass}$	640 GeV	Preliminary
	$T_{5/3} \rightarrow Wt$	$1e, \mu$	$\geq 1 \text{ b}, \geq 5 \text{ j}$	Yes	20.3	$T_{5/3} \text{ mass}$	840 GeV	Preliminary
Excited fermions	Excited quark $q^* \rightarrow q\gamma$	1γ	1 j	–	20.3	$q^* \text{ mass}$	3.5 TeV	only u^* and d^* , $\Lambda = m(q^*)$ 1309.3230
	Excited quark $q^* \rightarrow qg$	–	2 j	–	20.3	$q^* \text{ mass}$	4.09 TeV	only u^* and d^* , $\Lambda = m(q^*)$ 1407.1376
	Excited quark $b^* \rightarrow Wt$	$1 \text{ or } 2e, \mu$	$1 \text{ b}, 2 \text{ j or } 1 \text{ j}$	Yes	4.7	$b^* \text{ mass}$	870 GeV	left-handed coupling 1301.1583
	Excited lepton $\ell^* \rightarrow \ell\gamma$	$2e, \mu, 1\gamma$	–	–	13.0	$\ell^* \text{ mass}$	2.2 TeV	$\Lambda = 2.2 \text{ TeV}$ 1308.1364
	Excited lepton $\nu^* \rightarrow \ell W, \nu Z$	$3e, \mu, \tau$	–	–	20.3	$\nu^* \text{ mass}$	1.6 TeV	$\Lambda = 1.6 \text{ TeV}$ 1411.2921
Other	LSTC $a_T \rightarrow W\gamma$	$1e, \mu, 1\gamma$	–	Yes	20.3	$a_T \text{ mass}$	960 GeV	$m(W_R) = 2 \text{ TeV, no mixing}$ 1203.5420
	LRSM Majorana ν	$2e, \mu$	2 j	–	2.1	$N^0 \text{ mass}$	1.5 TeV	DY production, $\text{BR}(H_L^{\pm\pm} \rightarrow \ell\ell)=1$ 1412.0237
	Higgs triplet $H^{\pm\pm} \rightarrow \ell\ell$	$2e, \mu \text{ (SS)}$	–	–	20.3	$H^{\pm\pm} \text{ mass}$	551 GeV	DY production, $\text{BR}(H_L^{\pm\pm} \rightarrow \ell\tau)=1$ 1411.2921
	Higgs triplet $H^{\pm\pm} \rightarrow \ell\tau$	$3e, \mu, \tau$	–	–	20.3	$H^{\pm\pm} \text{ mass}$	400 GeV	$a_{\text{non-res}} = 0.2$ 1410.5404
	Monotop (non-res prod)	$1e, \mu$	1 b	Yes	20.3	spin-1 invisible particle mass	657 GeV	DY production, $ q = 5e$ Preliminary
	Multi-charged particles	–	–	–	20.3	multi-charged particle mass	785 GeV	DY production, $ g = 1g_D$ 1207.6411
	Magnetic monopoles	–	–	–	2.0	monopole mass	862 GeV	

*Only a selection of the available mass limits on new states or phenomena is shown.