

# SUSY Listings

**Michael Barnett**

Physics Division

Lawrence Berkeley National Laboratory

The PDF file of Listings has **110** pages

Encoders are:

- Monica D'Onofrio (ATLAS)
- Filip Moortgat (CMS)

Overseer is:

- Herbi Dreiner (theory)

In the listings we have made use of the following abbreviations for simplified models employed by the experimental collaborations in supersymmetry searches published in the past year.

## Simplified Models Table

- Tglu1A:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_1^0$ .  
**Tglu1B:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}'\tilde{\chi}_1^\pm$ ,  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$ .  
**Tglu1C:** gluino pair production with a 2/3 probability of having a  $\tilde{g} \rightarrow q\bar{q}'\tilde{\chi}_1^\pm$ ,  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$  decay and a 1/3 probability of having a  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_2^0$ ,  $\tilde{\chi}_2^0 \rightarrow Z^\pm\tilde{\chi}_1^0$  decay.  
**Tglu1D:** gluino pair production with one gluino decaying to  $q\bar{q}'\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm + \tilde{G}$ , and the other gluino decaying to  $q\bar{q}\tilde{\chi}_1^0$  with  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .  
**Tglu1E:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}'\tilde{\chi}_1^\pm$ ,  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_2^0$  and  $\tilde{\chi}_2^0 \rightarrow Z^\pm\tilde{\chi}_1^0$  where  $m_{\tilde{\chi}_1^\pm} = (m_{\tilde{g}} + m_{\tilde{\chi}_1^0})/2$ ,  $m_{\tilde{\chi}_2^0} = (m_{\tilde{\chi}_1^\pm} + m_{\tilde{\chi}_1^0})/2$ .  
**Tglu1F:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}'\tilde{\chi}_1^\pm$  or  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_2^0$  with equal branching ratios, where  $\tilde{\chi}_1^\pm$  decays through an intermediate scalar tau lepton or sneutrino to  $\tau\nu\tilde{\chi}_1^0$  and where  $\tilde{\chi}_2^0$  decays through an intermediate scalar tau lepton or sneutrino to  $\tau^+\tau^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$ ; the mass hierarchy is such that  $m_{\tilde{\chi}_1^\pm} \sim m_{\tilde{\chi}_2^0} = (m_{\tilde{g}} + m_{\tilde{\chi}_1^0})/2$  and  $m_{\tilde{\tau},\tilde{\nu}} = (m_{\tilde{\chi}_1^\pm} + m_{\tilde{\chi}_1^0})/2$ .  
**Tglu1G:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_2^0$ , and  $\tilde{\chi}_2^0$  decaying through an intermediate slepton or sneutrino to  $l^+l^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$  where  $m_{\tilde{\chi}_2^0} = (m_{\tilde{g}} + m_{\tilde{\chi}_1^0})/2$  and  $m_{\tilde{\ell},\tilde{\nu}} = (m_{\tilde{\chi}_2^0} + m_{\tilde{\chi}_1^0})/2$ .  
**Tglu1H:** gluino pair production with  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_2^0$ , and  $\tilde{\chi}_2^0 \rightarrow \tilde{\chi}_1^0 Z^{0(*)}$ .

an intermediate slepton or sneutrino to  $\nu\tilde{\chi}_1^0$  and where  $chiz_2$  decays through an intermediate slepton or sneutrino to  $l^+l^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$  and where  $m_{\tilde{\ell},\tilde{\nu}} = (m_{\tilde{\chi}_1^\pm} + m_{\tilde{\chi}_1^0})/2$ .

**Tchi1n2D:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_2^0$ , where  $\tilde{\chi}_1^\pm$  decays through an intermediate scalar tau lepton or sneutrino to  $\tau\nu\tilde{\chi}_1^0$  and where  $chiz_2$  decays through an intermediate scalar tau lepton or sneutrino to  $\tau^+\tau^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$  and where  $m_{\tilde{\tau},\tilde{\nu}} = (m_{\tilde{\chi}_1^\pm} + m_{\tilde{\chi}_1^0})/2$ .

**Tchi1n2E:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_2^0$ , where  $\tilde{\chi}_1^\pm \rightarrow W^\pm + \tilde{\chi}_1^0$  and  $\tilde{\chi}_2^0 \rightarrow H + \tilde{\chi}_1^0$ .

**Tn2n3A:** electroweak associated production of mass-degenerate neutralinos  $\tilde{\chi}_2^0$  and  $\tilde{\chi}_3^0$ , where  $\tilde{\chi}_2^0$  and  $\tilde{\chi}_3^0$  decay through intermediate sleptons to  $l^+l^-\tilde{\chi}_1^0$  and where the slepton mass is 5%, 25%, 50%, 75% and 95% of the  $\tilde{\chi}_2^0$  mass.

**Tn2n3B:** electroweak associated production of mass-degenerate neutralinos  $\tilde{\chi}_2^0$  and  $\tilde{\chi}_3^0$ , where  $\tilde{\chi}_2^0$  and  $\tilde{\chi}_3^0$  decay through intermediate sleptons to  $l^+l^-\tilde{\chi}_1^0$  and where  $m_{\tilde{\ell}} = (m_{\tilde{\chi}_2^0} + m_{\tilde{\chi}_1^0})/2$ .

## 49 models listed at beginning of section

**Tglu2A:** gluino pair production with  $\tilde{g} \rightarrow b\bar{b}\tilde{\chi}_1^0$ .  
**Tglu3A:** gluino pair production with  $\tilde{g} \rightarrow t\bar{t}\tilde{\chi}_1^0$ .  
**Tglu3B:** gluino pair production with  $\tilde{g} \rightarrow t\bar{t}$  where  $\tilde{t}$  decays exclusively to  $t\tilde{\chi}_1^0$ .

**Tglu3C:** gluino pair production with  $\tilde{g} \rightarrow t\bar{t}$  where  $\tilde{t}$  decays exclusively to  $c\tilde{\chi}_1^0$ .

**Tglu3D:** gluino pair production with  $\tilde{g} \rightarrow t\bar{b}\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$ .

**Tglu3E:** gluino pair production where the gluino decays 25% of the time through  $\tilde{g} \rightarrow t\bar{t}\tilde{\chi}_1^0$ , 25% of the time through  $\tilde{g} \rightarrow b\bar{b}\tilde{\chi}_1^0$  and 50% of the time through  $\tilde{g} \rightarrow t\bar{b}\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$ .

**Tglu4A:** gluino pair production with one gluino decaying to  $q\bar{q}'\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm + \tilde{G}$ , and the other gluino decaying to  $q\bar{q}\tilde{\chi}_1^0$  with  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .

**Tglu4B:** gluino pair production with gluinos decaying to  $q\bar{q}\tilde{\chi}_1^0$  and  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .

**Tglu4C:** gluino pair production with gluinos decaying to  $\tilde{g} \rightarrow q\bar{q}\tilde{\chi}_1^0$  and  $\tilde{\chi}_1^0 \rightarrow Z + \tilde{G}$ .

**Tsqk1:** squark pair production with  $\tilde{q} \rightarrow q\tilde{\chi}_1^0$ .

**Tsqk2:** squark pair production with  $\tilde{q} \rightarrow q\tilde{\chi}_2^0$  and  $\tilde{\chi}_2^0 \rightarrow Z + \tilde{\chi}_1^0$ .

**Tsqk3:** squark pair production with  $\tilde{q} \rightarrow q'\tilde{\chi}_1^\pm$ ,  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$  (like Tglu1B but for squarks)

**Tsqk4:** squark pair production with squarks decaying to  $q\tilde{\chi}_1^0$  and  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .

**Tsqk4A:** squark pair production with one squark decaying to  $q\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm + \tilde{G}$ , and the other squark decaying to  $q\tilde{\chi}_1^0$  with  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .

**Tsqk4B:** squark pair production with squarks decaying to  $q\tilde{\chi}_1^0$  and  $\tilde{\chi}_1^0 \rightarrow \gamma + \tilde{G}$ .

**Tstop1:** stop pair production with  $\tilde{t} \rightarrow t\tilde{\chi}_1^0$ .

**Tstop2:** stop pair production with  $\tilde{t} \rightarrow b\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$ .

**Tstop3:** stop pair production with the subsequent four-body decay  $\tilde{t} \rightarrow bff'\tilde{\chi}_1^0$  where  $f$  represents a lepton or a quark.

**Tstop4:** stop pair production with  $\tilde{t} \rightarrow c\tilde{\chi}_1^0$ .

**Tstop5:** stop pair production with  $\tilde{t} \rightarrow b\tilde{\nu}\tilde{\tau}$  with  $\tilde{\tau} \rightarrow \tau\tilde{G}$ .

**Tstop6:** stop pair production with  $\tilde{t} \rightarrow t + \tilde{\chi}_2^0$ , where  $\tilde{\chi}_2^0 \rightarrow Z + \tilde{\chi}_1^0$  or  $H + \tilde{\chi}_1^0$  each with Br=50%.

**Tstop7:** stop pair production with  $\tilde{t}_2 \rightarrow \tilde{t}_1 + H/Z$ , where  $\tilde{t}_1 \rightarrow t + \tilde{\chi}_1^0$ .

**Tstop8:** stop pair production with equal probability of the stop decaying via  $\tilde{t} \rightarrow t\tilde{\chi}_1^0$  or via  $\tilde{t} \rightarrow b\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0$ .

**Tstop9:** stop pair production with equal probability of the stop decaying via  $\tilde{t} \rightarrow c\tilde{\chi}_1^0$  or via the four-body decay  $\tilde{t} \rightarrow bff'\tilde{\chi}_1^0$  where  $f$  represents a lepton or a quark.

**Tstop10:** stop pair production with  $\tilde{t} \rightarrow b\tilde{\chi}_1^\pm$  and  $\tilde{\chi}_1^\pm \rightarrow W^\pm\tilde{\chi}_1^0 \rightarrow (ff') + \tilde{\chi}_1^0$  with a virtual W-boson.

**Tstop11:** stop pair production with  $\tilde{t} \rightarrow b\tilde{\chi}_1^\pm$  with  $\tilde{\chi}_1^\pm$  decaying through an intermediate slepton to  $\nu\tilde{\chi}_1^0$ .

**Tstop1RPV:** stop pair production with  $\tilde{t} \rightarrow b\tilde{s}$  via RPV coupling  $\lambda_{323}''$ .

**Tsbot1:** sbottom pair production with  $\tilde{b} \rightarrow b\tilde{\chi}_1^0$ .

**Tsbot2:** sbottom pair production with  $\tilde{b} \rightarrow t\tilde{\chi}_1^-$ ,  $\tilde{\chi}_1^- \rightarrow W^-\tilde{\chi}_1^0$ .

**Tsbot3:** sbottom pair production with  $\tilde{b} \rightarrow b\tilde{\chi}_2^0$ , where one of the  $\tilde{\chi}_2^0 \rightarrow Z^{(*)}\tilde{\chi}_1^0 \rightarrow ff\tilde{\chi}_1^0$  and the other  $\tilde{\chi}_2^0 \rightarrow \tilde{\ell}\ell^+ \rightarrow \ell^+\ell^-\tilde{\chi}_1^0$ .

**Tchi1chi1A:** electroweak pair and associated production of nearly mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_1^0$ , where  $\tilde{\chi}_1^\pm$  decays to  $\tilde{\chi}_1^0$  plus soft radiation, and where one of the  $\tilde{\chi}_1^0$  decays to  $\gamma + \tilde{G}$  while the other one decays to  $Z/H + \tilde{G}$  (with equal probability).

**Tchi1chi1B:** electroweak pair production of charginos  $\tilde{\chi}_1^\pm$ , where  $\tilde{\chi}_1^\pm$  decays through an intermediate slepton or sneutrino to  $\nu\tilde{\chi}_1^0$  and where the slepton or sneutrino mass is 5%, 25%, 50%, 75% and 95% of the  $\tilde{\chi}_1^\pm$  mass.

**Tchi1chi1C:** electroweak pair production of charginos  $\tilde{\chi}_1^\pm$ , where  $\tilde{\chi}_1^\pm$  decays through an intermediate slepton or sneutrino to  $\nu\tilde{\chi}_1^0$  and where  $m_{\tilde{\ell},\tilde{\nu}} = (m_{\tilde{\chi}_1^\pm} + m_{\tilde{\chi}_1^0})/2$ .

**Tchi1n1A:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_1^0$ , where  $\tilde{\chi}_1^\pm$  decays exclusively to  $W^\pm + \tilde{G}$  and  $\tilde{\chi}_1^0$  decays exclusively to  $\gamma + \tilde{G}$ .

**Tchi1n2A:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_2^0$ , where  $\tilde{\chi}_1^\pm$  decays through an intermediate slepton or sneutrino to  $\nu\tilde{\chi}_1^0$  and where  $\tilde{\chi}_2^0$  decays through an intermediate slepton or sneutrino to  $l^+l^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$ .

**Tchi1n2B:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_2^0$ , where  $\tilde{\chi}_1^\pm$  decays through an intermediate slepton or sneutrino to  $\nu\tilde{\chi}_1^0$  and where  $chiz_2$  decays through an intermediate slepton or sneutrino to  $l^+l^-\tilde{\chi}_1^0$  or  $\nu\bar{\nu}\tilde{\chi}_1^0$  and where the slepton or sneutrino mass is 5%, 25%, 50%, 75% and 95% of the  $\tilde{\chi}_1^\pm$  mass.

**Tchi1n2C:** electroweak associated production of mass-degenerate charginos  $\tilde{\chi}_1^\pm$  and neutralinos  $\tilde{\chi}_2^0$ , where  $\tilde{\chi}_1^\pm$  decays through

Clearly would be simplified if someone would actually **discover** supersymmetry (although not at the very beginning).

Each subsection is mixing various models.

In last edition, separated

**R-parity-conserving** and

**R-parity-violating**

into different subsections for each particle  
(where appropriate).

since they are unrelated.

Also, removed enormous amount of **“old”** data.

In some cases, “old” was defined as **2012**.

## R-parity conserving $\tilde{q}$ (Squark) mass limit

<i>VALUE (GeV)</i>	<i>CL%</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>&gt;1450 (CL = 95%) OUR EVALUATION</b>				CMSSM, $\tan\beta=30$ , $\mu > 0$
<b>&gt;1550 (CL = 95%) OUR EVALUATION</b>				Mass degenerate squarks
<b>&gt;1050 (CL = 95%) OUR EVALUATION</b>				Single light squark bounds
>1220	95	<sup>1</sup> AABOUD	17AR ATLS	$1\ell + \text{jets} + \cancel{E}_T$ , Tsqk3, $m_{\tilde{\chi}_1^0} = 0$ GeV
>1000	95	<sup>2</sup> AABOUD	17N ATLS	2 same-flavour, opposite-sign $\ell +$ jets + $\cancel{E}_T$ , Tsqk2, $m_{\tilde{\chi}_1^0} = 0$ GeV



Ten pages of data listings before footnotes and  
nothing older than 2014

## Heavy $\tilde{g}$ (Gluino) mass limit

For  $m_{\tilde{g}} > 60\text{--}70$  GeV, it is expected that gluinos would undergo a cascade decay via a number of neutralinos and/or charginos rather than undergo a direct decay to photinos as assumed by some papers. Limits obtained when direct decay is assumed are usually higher than limits when cascade decays are included.

Some earlier papers are now obsolete and have been omitted. They were last listed in our PDG 14 edition: K. Olive, *et al.* (Particle Data Group), Chinese Physics **C38** 070001 (2014) (<http://pdg.lbl.gov>).

VALUE (GeV)	CL%	DOCUMENT ID	TECN	COMMENT
>2040	95	<sup>1</sup> SIRUNYAN 18D CMS		top quark (hadronically decaying) + jets + $\cancel{E}_T$ , <u>Tglu3A</u> , $m_{\tilde{\chi}_1^0} = 0$ GeV
>1930	95	<sup>1</sup> SIRUNYAN 18D CMS		top quark (hadronically decaying) + jets + $\cancel{E}_T$ , <u>Tglu3B</u> , $m_{\tilde{t}_1} - m_{\tilde{\chi}_1^0} = 175$ GeV, $m_{\tilde{\chi}_1^0} = 200$ GeV
>1690	95	<sup>1</sup> SIRUNYAN 18D CMS		top quark (hadronically decaying) + jets + $\cancel{E}_T$ , Tglu3C

- <sup>1</sup> SIRUNYAN 18D searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing identified hadronically decaying top quarks, no leptons, and  $\cancel{E}_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the stop mass in the Tstop1 simplified model, see their Figure 8, and on the gluino mass in the Tglu3A, Tglu3B, Tglu3C and Tglu3E simplified models, see their Figure 9.
- <sup>2</sup> AABOUD 17AI searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one or more isolated lepton, at least eight jets, either zero or many  $b$ -jets, for evidence of R-parity violating decays of the gluino. No significant excess above the Standard Model expectations is observed. Limits up to 2.1 TeV are set on the gluino mass in R-parity-violating supersymmetry models as Tglu3A with LSP decay through the non-zero  $\lambda''_{112}$  coupling as  $\tilde{\chi}_1^0 \rightarrow uds$ . See their Figure 9.
- <sup>3</sup> AABOUD 17AI searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one or more isolated lepton, at least eight jets, either zero or many  $b$ -jets, for evidence of R-parity violating decays of the gluino. No significant excess above the Standard Model expectations is observed. Limits up to 1.65 TeV are set on the gluino mass in R-parity-violating supersymmetry models with  $\tilde{g} \rightarrow t\bar{t}$ ,  $\tilde{t} \rightarrow b\bar{s}$  through the non-zero  $\lambda''_{323}$  coupling. See their Figure 9.
- <sup>4</sup> AABOUD 17AI searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one or more isolated lepton, at least eight jets, either zero or many  $b$ -jets, for evidence of R-parity violating decays of the gluino. No significant excess above the Standard Model expectations is observed. Limits up to 1.8 TeV are set on the gluino mass in R-parity-violating supersymmetry models as Tglu1A with the LSP decay through the non-zero  $\lambda'$  coupling as  $\tilde{\chi}_1^0 \rightarrow qq\ell$ . See their Figure 9.
- <sup>5</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.75 TeV are set on the gluino mass in Tglu3A simplified models in case of off-shell top squarks and for  $m_{\tilde{\chi}_1^0} = 100 \text{ GeV}$ . See their Figure 4(a).
- <sup>6</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.57 TeV are set on the gluino mass in Tglu1E simplified models (2-step models) for  $m_{\tilde{\chi}_1^0} = 100 \text{ GeV}$ . See their Figure 4(b).
- <sup>7</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.86 TeV are set on the gluino mass in Tglu1G simplified models for  $m_{\tilde{\chi}_1^0} = 200 \text{ GeV}$ . See their Figure 4(c).
- <sup>8</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.8 TeV are set on the gluino mass in R-parity-violating supersymmetry models as Tglu3A with LSP decaying through the non-zero  $\lambda''_{112}$  coupling as  $\tilde{\chi}_1^0 \rightarrow uds$ . See their Figure 5(d).
- <sup>9</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.75 TeV are set on the gluino mass in R-parity-violating supersymmetry models as Tglu1A with LSP decaying through the non-zero  $\lambda'$  coupling as  $\tilde{\chi}_1^0 \rightarrow qq\ell$ . See their Figure 5(c).

- <sup>10</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.45 TeV are set on the gluino mass in R-parity-violating supersymmetry models where  $\tilde{g} \rightarrow t\bar{t}_1$  and  $\tilde{t}_1 \rightarrow sd$  through the non-zero  $\lambda''_{321}$  coupling. See their Figure 5(b).
- <sup>11</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.45 TeV are set on the gluino mass in R-parity-violating supersymmetry models where  $\tilde{g} \rightarrow t\bar{t}_1$  and  $\tilde{t}_1 \rightarrow b\bar{d}$  through the non-zero  $\lambda''_{313}$  coupling. See their Figure 5(a).
- <sup>12</sup> AABOUD 17AJ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two same-sign or three leptons, jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 400 GeV are set on the down type squark ( $\tilde{d}_R$  mass in R-parity-violating supersymmetry models where  $\tilde{d}_R \rightarrow t\bar{b}$  through the non-zero  $\lambda''_{313}$  coupling or  $\tilde{d}_R \rightarrow t\bar{s}$  through the non-zero  $\lambda''_{321}$ . See their Figure 5(e) and 5(f).
- <sup>13</sup> AABOUD 17AR searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one isolated lepton, at least two jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 2.1 TeV are set on the gluino mass in Tglu1B simplified models, with  $x = \frac{(m_{\tilde{\chi}_1^0} - m_{\tilde{\chi}_1^0})}{\lambda_{\tilde{\chi}_1^0}} / (m_{\tilde{g}} - m_{\tilde{\chi}_1^0}) = 1/2$ . Similar limits are obtained for variable  $x$  and fixed neutralino mass,  $m_{\tilde{\chi}_1^0} = 60 \text{ GeV}$ . See their Figure 13.
- <sup>14</sup> AABOUD 17AR searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one isolated lepton, at least two jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.74 TeV are set on the gluino mass in Tglu1E simplified model. Limits up to 1.7 TeV are also set on pMSSM models leading to similar signal event topologies. See their Figure 13.
- <sup>15</sup> AABOUD 17AY searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least four jets and large missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits up to 1.8 TeV are set on the gluino mass in Tglu3A simplified models assuming  $m_{\tilde{t}_1} - m_{\tilde{\chi}_1^0} = 5 \text{ GeV}$ . See their Figure 13.
- <sup>16</sup> AABOUD 17AZ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least seven jets and large missing transverse momentum. Selected events are further classified based on the presence of large R-jets or  $b$ -jets and no leptons. No significant excess above the Standard Model expectations is observed. Limits up to 1.8 TeV are set on the gluino mass in Tglu1E simplified models. See their Figure 6b.
- <sup>17</sup> AABOUD 17AZ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least seven jets and large missing transverse momentum. Selected events are further classified based on the presence of large R-jets or  $b$ -jets and no leptons. No significant excess above the Standard Model expectations is observed. Limits up to 1.54 TeV are set on the gluino mass in Tglu3A simplified models. See their Figure 7a.
- <sup>18</sup> AABOUD 17AZ searched in  $36.1 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least seven jets and large missing transverse momentum. Selected events are further classified based on the presence of large R-jets or  $b$ -jets and no leptons. No significant excess above the Standard Model expectations is observed. Limits are set for R-parity violating decays of the gluino assuming  $\tilde{g} \rightarrow t\bar{t}_1$  and  $\tilde{t}_1 \rightarrow b\bar{s}$  through the non-zero  $\lambda''_{323}$  couplings. The range 625–1375 GeV is excluded for  $m_{\tilde{t}_1} = 400 \text{ GeV}$ . See their Figure 7b.



<sup>19</sup>ABOUD 17n searched in  $14.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with 2 same-flavor, opposite-sign leptons (electrons or muons), jets and large missing transverse momentum. In Tglu1J models, gluino masses are excluded at 95% C.L. up to 1300 GeV for  $m_{\tilde{g}} = 0 \text{ GeV}$  and  $m_{\tilde{u}_L} = 1100 \text{ GeV}$ . See their Fig. 12 for exclusion limits as a function of  $m_{\tilde{\chi}_2^0}$ . Limits are also presented assuming  $m_{\tilde{g}} = m_{\tilde{u}_L} = 100 \text{ GeV}$ , see their Fig. 13.

<sup>20</sup>ABOUD 17n searched in  $14.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with 2 same-flavor, opposite-sign leptons (electrons or muons), jets and large missing transverse momentum. In Tglu1J models, gluino masses are excluded at 95% C.L. up to 1310 GeV for  $m_{\tilde{g}} = 400 \text{ GeV}$  and assuming  $m_{\tilde{\chi}_2^0} = (m_{\tilde{g}} + m_{\tilde{g}})/2$ . See their Fig. 16.

<sup>21</sup>ABOUD 17n searched in  $14.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with 2 same-flavor, opposite-sign leptons (electrons or muons), jets and large missing transverse momentum. In Tglu1J models, gluino masses are excluded at 95% C.L. up to 1700 GeV for small  $m_{\tilde{g}}$ . The results probe kinematic endpoints as small as  $m_{\tilde{g}} = m_{\tilde{u}_L} = (m_{\tilde{g}} - m_{\tilde{u}_L})/2 = 50 \text{ GeV}$ . See their Fig. 14.

<sup>22</sup>KHACHATRYAN 17 searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing four or more jets, no more than one lepton, and missing transverse momentum, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No evidence for an excess over the expected background is observed. Limits are derived on the gluino mass in the Tglu1A, Tglu2A and Tglu3A simplified models, see Figs. 16 and 17. Also, assuming gluino decay into three-body processes involving third-generation quarks plus a neutrino/charged, and assuming  $m_{\tilde{g}} = m_{\tilde{u}_L} = 5 \text{ GeV}$ , a branching ratio-independent limit on the gluino mass is given, see Fig. 18.

<sup>23</sup>KHACHATRYAN 17A searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing at least four jets (including b-jets), missing transverse momentum and tagged top quarks. No evidence for an excess over the expected background is observed. Gluino masses up to 1550 GeV and neutralino masses up to 900 GeV are excluded at 95% C.L. See Fig. 13.

<sup>24</sup>KHACHATRYAN 17A searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing at least four jets (including b-jets), missing transverse momentum and tagged top quarks. No evidence for an excess over the expected background is observed. Gluino masses up to 1450 GeV and neutralino masses up to 820 GeV are excluded at 95% C.L. See Fig. 13.

<sup>25</sup>KHACHATRYAN 17AS searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with a single electron or muon and multiple jets. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3A and Tglu1B simplified models, see their Fig. 16.

<sup>26</sup>KHACHATRYAN 17AS searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least three charged leptons, in any combination of electrons and muons, and significant  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3A and Tglu1B simplified models, see their Fig. 16.

<sup>27</sup>KHACHATRYAN 17P searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one or more jets and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu1A, Tglu2A, Tglu3A, Tglu3B, Tglu3C and Tglu1B simplified models, see their Figures 7 and 8. Limits are also set on the squark mass in the Tbsq1 and Tbsq2 simplified models, see Fig. 7, and on the sbottom mass in the Tbsb1 simplified model, see Fig. 8. Finally, limits are set on the stop mass in the Tstop1, Tstop3, Tstop4, Tstop5 and Tstop7 simplified models, see Fig. 8.

<sup>28</sup>KHACHATRYAN 17P searched in  $2.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two photons and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino and squark mass in the context of general gauge mediated SUSY breaking models Tglu4B and Tbsq4. See their Fig. 4.

<sup>29</sup>KHACHATRYAN 17Y searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events containing at least 8 or 10 jets, possibly b-tagged, coming from R-parity-violating decays of supersymmetric particles. No excess over the expected background is observed. Limits are derived on the gluino mass, assuming various RPV decay modes, see Fig. 7.

<sup>30</sup>SIRUNYAN 17A searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with a single lepton (electron or muon) and multiple jets, including b-jets, and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3A and Tglu3B simplified models, see their Figure 2.

<sup>31</sup>SIRUNYAN 17A searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least one photon, jets and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu4A and Tglu4B simplified models, and on the squark mass in the Tbsq4A and Tbsq4B simplified models, see their Figure 6.

<sup>32</sup>SIRUNYAN 17A searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with one or more jets and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu1A, Tglu2A, Tglu3A and Tglu3B simplified models, see their Figures 6. Limits are also set on the squark mass in the Tbsq1 simplified model (for single light quark and for 8 degenerate light quarks), on the sbottom mass in the Tbsb1 simplified model and on the stop mass in the Tstop1 simplified model, see their Fig. 7. Finally, limits are set on the stop mass in the Tstop2, Tstop4 and Tstop7 simplified models, see Fig. 8.

<sup>33</sup>SIRUNYAN 17P searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with multiple jets and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu1A, Tglu2A, Tglu3A and Tglu3B simplified models, see their Fig. 12. Limits are also set on the squark mass in the Tbsq1 simplified model, on the stop mass in the Tstop1 simplified model, and on the sbottom mass in the Tbsb1 simplified model, see their Fig. 13.

<sup>34</sup>SIRUNYAN 17S searched in  $35.9 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two isolated same-sign leptons, jets, and large  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the mass of the gluino mass in the Tglu3A, Tglu3B, Tglu3C, Tglu3D and Tglu3E simplified models, see their Figures 5 and 6, and on the sbottom mass in the Tbsb2 simplified model, see their Figure 6.

<sup>35</sup>ABOUD 16AC searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with hadronic jets, 1 or two hadronically decaying  $\tau$  and  $E_T$ . In Tglu1F, gluino masses are excluded at 95% C.L. up to 1570 GeV for  $m_{\tilde{g}} = 100 \text{ GeV}$  and  $m_{\tilde{u}_L} = 100 \text{ GeV}$ . Neutralino masses up to 700 GeV are excluded for all gluino masses between 800 GeV and 1500 GeV, while the strongest neutralino mass exclusion of 750 GeV is achieved for gluino masses around 1400 GeV. See their Fig. 8. Limits are also presented in the context of Gauge-Mediated SUSY Breaking models, in this case values of  $A$  below 92 TeV are excluded at the 95% C.L. corresponding to gluino masses below 200 GeV. See their Fig. 9.

<sup>36</sup>ABOUD 16I searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with one isolated electron or muon, hadronic jets, and  $E_T$ . Gluino-mediated pair production of stops with a nearly mass-degenerate stop and neutralino are targeted and gluino masses are excluded at 95% C.L. up to 1460 GeV. A 100% of stop decaying via charm neutrino is assumed. The results are also valid in case of 4-body decays  $\tau_1 \rightarrow f f' b \tilde{\chi}_1^0$ . See their Fig. 9.

<sup>37</sup>ABOUD 16I searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two photons, hadronic jets and  $E_T$ . No significant excess above the Standard Model expectations is observed. Exclusion limits at 95% C.L. are set on gluino masses in the general gauge-mediated SUSY breaking model (GGM), for bino-like NLSP. See their Fig. 9.

<sup>38</sup>KHACHATRYAN 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>39</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>40</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>41</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>42</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>43</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>44</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>45</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>46</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>47</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>48</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>49</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1510 GeV are excluded at the 95% C.L. in a simplified model with only gluinos and the lightest neutralino. See their Fig. 7b.

<sup>50</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing hadronic jets, large  $E_T$ , and no electrons or muons. No significant excess above the Standard Model expectations is observed. Gluino masses below 1500 GeV are excluded at the 95% C.L. in a simplified model with gluinos decaying via an intermediate  $\tilde{\chi}_1^0$  to two quarks, a W boson and a  $\tilde{\chi}_1^0$  for  $m_{\tilde{g}} = 200 \text{ GeV}$ . See their Fig. 8.

<sup>51</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing several energetic jets, of which at least three must be identified as b-jets, large  $E_T$  and no electrons or muons. No significant excess above the Standard Model expectations is observed. For  $\tilde{\chi}_1^0$  below 800 GeV, gluino masses below 1780 GeV are excluded at 95% C.L. for gluinos decaying via bottom squarks. See their Fig. 7a.

<sup>52</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events containing several energetic jets, of which at least three must be identified as b-jets, large  $E_T$  and one electron or muon. Large-radius jets with a high mass are also used to identify highly boosted top quarks. No significant excess above the Standard Model expectations is observed. For  $\tilde{\chi}_1^0$  below 780 GeV, gluino masses below 1760 GeV are excluded at 95% C.L. for gluinos decaying via top squarks. See their Fig. 7b.

<sup>53</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with exactly two same-sign leptons or at least three leptons, multiple hadronic jets, b-jets, and  $E_T$ . No significant excess over the Standard Model expectation is found. Exclusion limits at 95% C.L. are set on the gluino mass in various simplified models (Tglu1D, Tglu1E, Tglu3A). See their Figs. 4a, 4b, and 4d.

<sup>54</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  in final states with one isolated electron or muon, hadronic jets, and  $E_T$ . The data agree with the SM background expectation in the six signal selections defined in the search, and the largest deviation is at a 2.1 standard deviation excess. Gluino are excluded at 95% C.L. up to 1600 GeV assuming they decay via the lightest charged to the lightest neutralino as in the model Tglu1B for  $m_{\tilde{g}} = 100 \text{ GeV}$ , assuming  $m_{\tilde{g}} = (m_{\tilde{g}} + m_{\tilde{g}})/2$ . See their Fig. 6.

<sup>55</sup>ABOUD 16B searched in  $3.2 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with various hadronic jet multiplicities from  $\geq 7$  to  $\geq 10$  and with various b-jet multiplicities requirements. No significant excess over the Standard Model expectation is found. Exclusion limits at 95% C.L. are set on the gluino mass in one simplified model (Tglu1E) and a pMSSM-inspired model. See their Fig. 5.

<sup>56</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>57</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>58</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>59</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>60</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>61</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>62</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>63</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>64</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>65</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>66</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>67</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>68</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>69</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>70</sup>KHACHATRYAN 16M searched in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with highly boosted W-bosons and b-jets, using the razor variables ( $M_T$  and  $R^2$ ) to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu3C and Tglu3B simplified models, see their Fig. 12.

<sup>71</sup>KHACHATRYAN 16B searched in  $19.5 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events containing 0 or 1 leptons and b-tagged jets, coming from R-parity-violating decays of supersymmetric particles. No excess over the expected background is observed. Limits are derived on the gluino mass, assuming the RPV  $\tilde{g} \rightarrow t b s$  decay, see Fig. 7 and 10.

<sup>72</sup>KHACHATRYAN 16B searched in  $19.5 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with two opposite-sign, same-flavor leptons, jets, and missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu4C simplified model, see Fig. 4, and on sbottom masses in the Tbsb1 simplified model, see Fig. 5.

<sup>73</sup>KHACHATRYAN 16B searched in  $19.5 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13 \text{ TeV}$  for events with at least four energetic jets and significant  $E_T$ , no identified isolated electron or muon or charged tauon, and missing transverse momentum. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the Tglu1A, Tglu1C, Tglu2A, and Tglu3A simplified models, see Fig. 8.

<sup>74</sup>AAD 156C searched in  $20.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with jets, missing  $E_T$ , and two opposite-sign same flavor isolated leptons featuring either a kinematic edge, or a peak at the Z-boson mass, in the invariant mass spectrum. No evidence for a statistically significant excess over the expected SM backgrounds is observed and 95% C.L. exclusion limits are derived in a GGM simplified model of gluino pair production where the gluino decays into quarks, a Z-boson, and a massless gravitino LSP. See Fig. 12. Also, limits are set in simplified models with slepton/stopino intermediate states, see Fig. 13.

<sup>75</sup>AAD 15B summarized and extended ATLAS searches for gluinos and first- and second-generation squarks in final states containing jets and missing transverse momentum, with or without leptons or b-jets in the  $\sqrt{s} = 8 \text{ TeV}$  data set collected in 2012. The paper reports the results of new interpretations and statistical combinations of previously published analyses, as well as new analyses. Exclusion limits at 95% C.L. are set on the gluino mass in several R-parity conserving models, leading to a generalized constraint on gluino masses exceeding 1150 GeV for lightest supersymmetric particle masses below 600 GeV. See their Figs. 10, 19, 20, 21, 23, 25, 26, 29, 37.

<sup>76</sup>AAD 15B interpreted the results of a wide range of ATLAS direct searches for super-symmetry, during the first run of the LHC using the  $\sqrt{s} = 7 \text{ TeV}$  and  $\sqrt{s} = 8 \text{ TeV}$  supersymmetric particles in events containing jets and two same-sign leptons or three leptons (pMSSM). The integrated luminosity was up to  $3.6 \text{ fb}^{-1}$ . From an initial random sampling of 500 million pMSSM points, generated from the 19-parameter pMSSM, a total of 310,327 model points with  $\tilde{\chi}_1^0$  LSP were selected each of which satisfies constraints from previous collider searches, precision measurements, cold dark matter energy density measurements and direct dark matter searches. The impact of the ATLAS Run 1 searches on this space was presented, considering the fraction of model points surviving, after projection into two-dimensional spaces of sparticle masses. Good complementarity is observed between the ATLAS and LHC searches for supersymmetry. The impact of unique sensitivity, ATLAS searches have good sensitivity at LSP mass below 800 GeV.

<sup>77</sup>AAD 15C searched in  $20.3 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with one or more photons, hadronic jets or b-jets and  $E_T$ . No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in the general gauge-mediated SUSY breaking model (GGM), for bino-like or higgsino-bino admixtures NLSP. See Fig. 8, 10, 11.

<sup>78</sup>KHACHATRYAN 15AF searched in  $19.5 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with at least two energetic jets and significant  $E_T$ , using the transverse mass variable  $M_{T2}$  to discriminate between signal and background processes. No significant excess above the Standard Model expectations is observed. Limits are set on the gluino mass in simplified models where the decay  $\tilde{g} \rightarrow q \tilde{q} \tilde{\chi}_1^0$  takes place with a branching ratio of 100%, see Fig. 13(a), or where the decay  $\tilde{g} \rightarrow b \tilde{b} \tilde{\chi}_1^0$  takes place with a branching ratio of 100%, see Fig. 13(b), or where the decay  $\tilde{g} \rightarrow t \tilde{t} \tilde{\chi}_1^0$  takes place with a branching ratio of 100%, see Fig. 13(c). See also Table 1. Exclusion limits in the CMSSM, assuming  $\tan\beta = 30$ ,  $A_0 = -2 \max(m_0, m_{1/2})$  and  $\mu > 0$ , are also presented, see Fig. 15.

<sup>79</sup>KHACHATRYAN 15AF searched in  $19.5 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 8 \text{ TeV}$  for events with at least two energetic jets and significant  $E_T$ , using the transverse mass variable  $M_{T2}$  to discriminate between signal and background processes. No significant



**The encoders, overseer, and I have had lots of discussions about improved handling of supersymmetry listings. Including list of simplified models at front, and radical removing “older” papers.**

**Also discussed at a workshop here.**

**They have also met separately from me.**

**But the complexities are major.**

**We will continue to seek ways to make the supersymmetry listings more useable.**

**Discovery would help.**