Search for photonic signatures of gauge-mediated supersymmetry in 13 TeV pp collisions with the ATLAS detector arXiv:1802.03158

1. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{S-L}}$
   Process: $pp \to \tilde{g}\tilde{g}$
   gluino-bino model
   $m_{\tilde{g}} = 1900$ GeV, $m_{\tilde{\chi}^0_1} = 300$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	58.8	58.8
Two photons	17.9	17.9
Photon $p_T > 75$ GeV	15.2	15.2
$E_T^{\mathrm{miss}} > 150$ GeV	13.1	13.4
$H_T > 2750$ GeV	11.7	11.5
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	8.9	9.3

2. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{S-H}}$
   Process: $pp \to \tilde{g}\tilde{g}$
   gluino-bino model
   $m_{\tilde{g}} = 1900$ GeV, $m_{\tilde{\chi}^0_1} = 1700$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	58.8	58.8
Two photons	17.0	20.0
Photon $p_T > 75$ GeV	16.9	19.8
$E_T^{\mathrm{miss}} > 250$ GeV	15.8	18.7
$H_T > 2000$ GeV	15.6	18.1
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	14.9	13.6
$\Delta\phi(\gamma, E_T^{\mathrm{miss}}) > 0.5$	14.8	12.8

3. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{S-L}}$
   Process: $pp \to \tilde{q}\tilde{q}^*$
   squark-bino model
   $m_{\tilde{q}} = 1700$ GeV, $m_{\tilde{\chi}^0_1} = 200$ GeV Events (just $\tilde{u}_L\tilde{u}^*_L$) generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	27.5	27.4
Two photons	11.0	11.8
Photon $p_T > 75$ GeV	9.5	9.9
$E_T^{\mathrm{miss}} > 150$ GeV	8.7	9.0
$H_T > 2750$ GeV	7.1	7.2
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	5.3	6.3

4. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{S-H}}$
   Process: $pp \to \tilde{q}\tilde{q}^*$
   squark-bino model
   $m_{\tilde{q}} = 1700$ GeV, $m_{\tilde{\chi}^0_1} = 1600$ GeV Events (just $\tilde{u}_L\tilde{u}^*_L$) generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	27.5	27.4
Two photons	8.4	9.8
Photon $p_T > 75$ GeV	8.4	9.7
$E_T^{\mathrm{miss}} > 250$ GeV	7.8	9.1
$H_T > 2000$ GeV	7.5	8.7
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	7.2	6.6
$\Delta\phi(\gamma, E_T^{\mathrm{miss}}) > 0.5$	7.2	6.3

5. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{W-L}}$
   Process: $pp \to \tilde{\chi}_1^+ \tilde{\chi}_2^0$
   wino-bino model
   $m_{\tilde{\chi}_1^\pm} = 1000$ GeV, $m_{\tilde{\chi}_2^0} = 1000$ GeV, $m_{\tilde{\chi}_1^0} = 200$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 1000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	70.8	70.8
Two photons	26.3	27.9
Photon $p_T > 75$ GeV	21.3	20.9
$E_T^{\mathrm{miss}} > 150$ GeV	16.9	16.6
$H_T > 1500$ GeV	14.7	13.3
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	11.0	11.0

6. $\mathrm{SR}^{\gamma\gamma}_{\mathrm{W-H}}$
   Process: $pp \to \tilde{\chi}_1^+ \tilde{\chi}_2^0$
   wino-bino model
   $m_{\tilde{\chi}_1^\pm} = 1000$ GeV, $m_{\tilde{\chi}_2^0} = 1000$ GeV, $m_{\tilde{\chi}_1^0} = 800$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 1000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	70.8	70.8
Two photons	19.6	22.4
Photon $p_T > 75$ GeV	19.2	21.7
$E_T^{\mathrm{miss}} > 250$ GeV	15.6	17.0
$H_T > 1000$ GeV	15.6	16.8
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.5$	14.8	12.7
$\Delta\phi(\gamma, E_T^{\mathrm{miss}}) > 0.5$	14.6	12.3

7. $\mathrm{SR}_{\mathrm{L}}^{\gamma j}$
   Process: $pp \to \tilde{g}\tilde{g}$
   higgsino-bino model
   $m_{\tilde{g}} = 1974$ GeV, $m_{\tilde{\chi}_1^0} = 442$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	40.3	40.3
At least one photon $p_T > 140$ GeV	17.0	19.0
Lepton veto	10.3	9.4
Photon $p_T > 145$ GeV	9.7	7.8
$E_T^{\mathrm{miss}} > 300$ GeV	6.6	5.4
Number of jets ≥ 5	6.5	5.3
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.4$	5.6	4.6
$\Delta\phi(\gamma, E_T^{\mathrm{miss}}) > 0.4$	4.9	4.1
$m_{\mathrm{eff}} > 2000$ GeV	4.8	4.1
$R_T^4 < 0.9$	4.0	3.6

8. $\mathrm{SR}_{\mathrm{H}}^{\gamma j}$
   Process: $pp \to \tilde{g}\tilde{g}$
   higgsino-bino model
   $m_{\tilde{g}} = 1974$ GeV, $m_{\tilde{\chi}_1^0} = 1868$ GeV
   Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 10000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Initial events	40.3	40.3
At least one photon $p_T > 140$ GeV	23.4	24.7
Lepton veto	22.0	22.8
Photon $p_T > 400$ GeV	20.7	16.8
$E_T^{\mathrm{miss}} > 400$ GeV	18.5	15.2
Number of jets ≥ 3	14.8	13.1
$\Delta\phi(\mathrm{jet}, E_T^{\mathrm{miss}}) > 0.4$	12.2	11.1
$\Delta\phi(\gamma, E_T^{\mathrm{miss}}) > 0.4$	12.2	11.1
$m_{\mathrm{eff}} > 2400$ GeV	8.9	8.5