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NLO-NLL Higgsino-like Cross Sections (fully-degenerate case)

The following cross sections are for pure higgsino-like pair production assuming N_1 , C_1 , N_2 with degenerate mass m , and for the sum of the relevant processes: N_1N_2 , N_1C_1 , N_2C_1 ($=N_1C_1$), C_1C_1 (N_1N_1 and N_2N_2 vanish). They have been calculated for $\sqrt{s} = 13$ TeV at NLO-NLL using the resumino code from B. Fuks et al with CTEQ6.6 and MSTW2008nlo90cl PDFs. Final numbers are calculated using the PDF4LHC recommendations for the two sets of cross sections.

The following sentence accurately describes all the assumptions in the cross sections calculation and is suitable to be included in the interpretation description:

The production cross sections are computed at NLO plus next-to-leading-log (NLL) precision in a limit of mass-degenerate higgsino $\chi_{2,3}$, $\chi_{1,2}$, and $\chi_{1,2}$ with all the other sparticles assumed to be heavy and decoupled.

The slha file used to produce these numbers can found in the attachment below: hino.dat

When using these cross sections, please cite the following two references, available below in bibtex format:

Show References Hide References

```
@article{Fuks:2012qx,
  author      = "Fuks, Benjamin and Klasen, Michael and Lamprea, David R.
                and Rothering, Marcel",
  title       = "{Gaugino production in proton-proton collisions at a
                center-of-mass energy of 8 TeV}",
  journal     = "JHEP",
  volume      = "10",
  pages       = "081",
  doi         = "10.1007/JHEP10(2012)081",
  year        = "2012",
  eprint      = "1207.2159",
  archivePrefix = "arXiv",
  primaryClass = "hep-ph",
  reportNumber = "IPHC-PHENO-12-07, MS-TP-12-05",
  SLACcitation = "%%CITATION = ARXIV:1207.2159;%%",
}
```

```
@article{Fuks:2013vua,
  author      = "Fuks, Benjamin and Klasen, Michael and Lamprea, David R.
                and Rothering, Marcel",
  title       = "{Precision predictions for electroweak superpartner
                production at hadron colliders with {\sc Resumino}}",
  journal     = "Eur. Phys. J. C",
  volume      = "73",
  pages       = "2480",
  doi         = "10.1140/epjc/s10052-013-2480-0",
  year        = "2013",
  eprint      = "1304.0790",
  archivePrefix = "arXiv",
  primaryClass = "hep-ph",
  reportNumber = "CERN-PH-TH-2013-064, IPhC-PHENO-13-02, MS-TP-13-06",
  SLACcitation = "%%CITATION = ARXIV:1304.0790;%%",
}
```

Should the analyzer need the cross-section information for a mass value that is not tabulated below, s/he can obtain it using the ROOT macros provided under:

/afs/cern.ch/user/a/amete/public/EWKGauginoCrossSections_13TeV

For this specific grid one needs to do:

```
root -l 'get_gaugino.C("CN", "hino", mass)'
```

where

mass

is the mass of the sparticle in GeV. The result of the interpolation can be seen here.

NLO-NLL hino-like

m [GeV]	xsec [fb]	uncertainty [fb]
100	16797.2	603.411
150	3832.31	158.509
200	1335.62	63.3568
250	577.314	30.7553
300	284.855	16.7172
350	153.841	9.85502
400	88.7325	6.18924
450	53.7702	4.02376
500	33.8387	2.7158
550	21.9868	1.86729
600	14.6677	1.32111
650	9.96406	0.937269
700	6.89981	0.678178
750	4.8731	0.493209
800	3.46143	0.372511
850	2.4923	0.274194
900	1.80616	0.204818
950	1.32692	0.155285
1000	0.968853	0.122278
1050	0.731306	0.0866612
1100	0.538005	0.0721461
1150	0.405108	0.0488588
1200	0.299347	0.0486751
1250	0.240471	0.0286811
1300	0.160765	0.0196493
1350	0.111174	0.0197535
1400	0.0780263	0.00926313
1450	0.0696962	0.0138617

CTEQ6.6 numbers: NLO-NLL hino-like

m [GeV]	xsec [fb]	-scale unc [%]	-pdf unc [%]	+scale unc [%]	+pdf unc [%]
100	16696	-1.1	-2.6	-0.16	3.1
150	3790.2	-0.52	-2.9	-0.41	3.4
200	1315.9	-0.6	-3.1	-0.21	3.8
250	567.17	-0.59	-3.4	-0.099	4.2

300	279.02	-0.44	-3.7	0.026	4.6
350	150.3	-0.36	-4.1	0.11	4.9
400	86.474	-0.4	-4.4	0.13	5.4
450	52.267	-0.37	-4.7	0.21	5.8
500	32.851	-0.5	-5.1	0.13	6.2
550	21.307	-0.55	-5.5	0.11	6.5
600	14.173	-0.47	-5.7	-0.031	6.9
650	9.6179	-0.59	-6	-0.034	7.2
700	6.6389	-0.71	-6.2	-0.044	7.8
750	4.6981	-0.84	-6.6	-0.4	8
800	3.3234	-0.9	-6.9	-0.34	8.3
850	2.3991	-0.83	-7.4	-0.45	8.5
900	1.7311	-0.83	-7.4	-0.3	9.2
950	1.2754	-0.81	-8	-0.57	9.2
1000	0.92082	-1	-7.9	-0.59	9.9
1050	0.70175	-1	-8	-0.35	11
1100	0.51342	-1	-9.2	-0.67	10
1150	0.39244	-1	-9.1	-0.54	11
1200	0.27714	-1.1	-9.4	-0.79	11
1250	0.23564	-1.1	-10	-0.65	12
1300	0.15713	-1.1	-10	-1	13
1350	0.10069	-1.2	-9.1	-1.3	12
1400	0.075869	-1.3	-9.2	-1.4	12
1450	0.0622	-1.4	-10	-1.2	13

MSTW2008nlo90cl numbers: NLO-NLL hino-like

m [GeV]	xsec [fb]	-scale unc [%]	-pdf unc [%]	+scale unc [%]	+pdf unc [%]
100	16834	-1.2	-2.6	-0.19	3.4
150	3853.8	-0.52	-2.8	-0.38	3.5
200	1347.2	-0.62	-2.9	-0.2	3.8
250	584.02	-0.6	-3.1	-0.073	4.1
300	288.83	-0.5	-3.3	0.087	4.4
350	156.25	-0.36	-3.5	0.24	4.8
400	90.279	-0.44	-3.8	0.32	5.1
450	54.778	-0.37	-4	0.34	5.5
500	34.527	-0.47	-4.2	0.27	5.9
550	22.457	-0.52	-4.4	0.29	6.2
600	14.984	-0.51	-4.6	0.25	6.7
650	10.187	-0.72	-4.8	0.011	7
700	7.0518	-0.71	-4.9	0.11	7.5
750	4.9649	-0.71	-5.1	0.12	8.1
800	3.534	-0.71	-5.4	-0.1	8.5
850	2.5482	-0.85	-5.7	-0.12	8.6
900	1.8425	-0.75	-5.9	-0.19	9.1
950	1.3508	-1.1	-6.1	-0.15	9.7
1000	0.99227	-1.1	-6.6	-0.46	10
1050	0.74007	-1.1	-6.8	-0.38	11
1100	0.54934	-1.2	-6.8	-0.39	11
1150	0.4069	-1.2	-7.5	-0.34	12

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1200	0.31028	-1.4	-7.8	-0.29	12
1250	0.23797	-1.4	-8.5	-0.39	13
1300	0.15885	-1.5	-8.6	-0.86	14
1350	0.11199	-1.4	-5.4	0.46	17
1400	0.076685	-1.6	-8.5	-1.3	14
1450	0.072766	-1.9	-9.3	-0.57	15

-- LesyaShchutka - 2015-02-11

This topic: LHCPHysics > SUSYCrossSections13TeVhino

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