Erratum: Search for dark matter and unparticles produced in association with a Z boson in proton-proton collisions at $\sqrt{s} = 8$ TeV [Phys. Rev. D **93**, 052011 (2016)]

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In the original paper, incorrect values were used for the production cross section times branching fraction for the unparticle signal. The branching fraction of Z bosons decaying to electrons or muons was not taken into account, effectively multiplying the signal normalization by a constant factor of approximately 30. Using the correct values leads to a decrease in the excluded cutoff scale Λ_U and an increase in the excluded coupling λ over the full range of d_U .

In Figures 4 and 5, as well as Table 3, the respective unparticle entries were labeled incorrectly. Instead of the given parameter values, they correspond to a values of the scaling dimension $d_U = 1.6$ and cutoff scale $\Lambda_U = 1.96$ TeV.

FIG. 9. Left: the 95% CL upper limits on the coupling λ between the unparticle and SM fields for fixed effective cutoff scale values of $\Lambda_U = 10$ and 100 TeV. The inset provides an expanded view of the limits at low scaling dimension. Right: the 95% CL lower limit on the unparticle effective cutoff scale Λ_U for a fixed value of the coupling $\lambda = 1$. The results from the CMS monojet search [1] and reinterpretations of LEP and CDF searches [2] are also shown for comparison. The excluded region is indicated by the shading. Note that the individual results correspond to different unparticle operators. The LEP results assume a coupling of unparticles to Z bosons and photons. The CDF (CMS) monojet result is based on a gluon-unparticle (gluon- and quark-unparticle) coupling operator. The cutoff scales Λ_U for different operators do not have to be identical, and the comparison shown here is only qualitative.

TABLE VIII. Expected and observed 95% CL upper limits on the coupling λ between unparticles and the SM fields, for values of d_U in the range from 1.01 to 2.20 and a fixed effective cutoff scale $\Lambda_U = 10$ TeV.

d_U	λ			Observed
	Expected	Expected -1σ	Expected $+1\sigma$	
1.01	0.25	0.21	0.29	0.24
1.02	0.19	0.16	0.23	0.18
1.04	0.16	0.14	0.19	0.16
1.06	0.15	0.13	0.18	0.16
1.09	0.16	0.14	0.19	0.17
1.10	0.17	0.14	0.20	0.17
1.30	0.46	0.39	0.54	0.48
1.50	1.49	1.27	1.76	1.61
1.60	2.58	2.19	3.04	2.77
1.70	4.71	4.00	5.55	5.21
1.90	15.6	13.3	18.4	17.6
2.20	80.7	68.5	95.1	92.8

TABLE IX. Expected and observed 95% CL upper limits on the coupling λ between unparticles and the SM fields, for values of d_U in the range from 1.01 to 2.20 and a fixed effective cutoff scale $\Lambda_U = 100$ TeV.

d_U	λ			Observed
	Expected	Expected -1σ	Expected $+1\sigma$	
1.01	0.25	0.21	0.30	0.25
1.02	0.20	0.17	0.24	0.19
1.04	0.18	0.15	0.21	0.18
1.06	0.18	0.15	0.21	0.18
1.09	0.20	0.17	0.24	0.21
1.10	0.21	0.18	0.25	0.21
1.30	0.92	0.78	1.09	0.95
1.50	4.71	4.00	5.55	5.08
1.60	10.3	8.72	12.1	11.0
1.70	23.6	20.1	27.8	26.1
1.90	124	105	146	140
2.20	1279	1086	1507	1470

TABLE X. Expected and observed 95% CL lower limits on the effective cutoff scale Λ_U for values of d_U in the range from 1.50 to 2.20 and a fixed coupling $\lambda = 1$.

d_U	Λ_U (TeV)			Observed
	Expected	Expected -1σ	Expected $+1\sigma$	
1.50	4.51	6.26	3.25	3.87
1.60	2.06	2.71	1.57	1.83
1.70	1.09	1.38	0.87	0.95
1.80	0.73	0.90	0.59	0.63
1.90	0.47	0.57	0.39	0.41
2.00	0.38	0.45	0.33	0.34
2.20	0.26	0.29	0.22	0.23

The corrected limits are shown in Fig. 9 and Tables VIII–X.

The exclusion observed in this analysis therefore does not generally give the most stringent limits on Λ_U .

- [1] CMS Collaboration, Search for dark matter, extra dimensions, and unparticles in monojet events in proton-proton collisions at $\sqrt{s} = 8$ TeV, *Eur. Phys. J. C* **75**, 235 (2015).
- [2] S. Kathrein, S. Knapen, and M. J. Strassler, Bounds from LEP on unparticle interactions with electroweak bosons, *Phys. Rev. D* **84**, 015010 (2011).