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Erratum

Erratum to: Finding new physics without learning about it: anomaly detection as a tool for searches at colliders

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On further processing the simulated data used in the article for open access release, we detected a defective feature in the benchmark signals samples.

The issue affects the results of assessing the performance of the Anomaly Detection (AD) methods with the selected Beyond the Standard Model signals reported in Sect. 5—Comparison of the AD methods for benchmark signals. The correct results are presented in Figs. 1, 2 and Table 1.

Although the performance of the AD methods changes quantitatively, their relative sensitivity to the benchmark signals is generally maintained: deep learning outperforms shallow learning and the Deep SVDD model presents the best response to the variety of new signals tested, indicating to better suit to the generic detection purpose.

The data samples were made available for open access through the Zenodo online repository for research data, with record number 5126747 [2]. Finally, the corrected version of the article is also available in arXiv [3].

The original article can be found online at https://doi.org/10.1140/epjc/s10052-020-08807-w.

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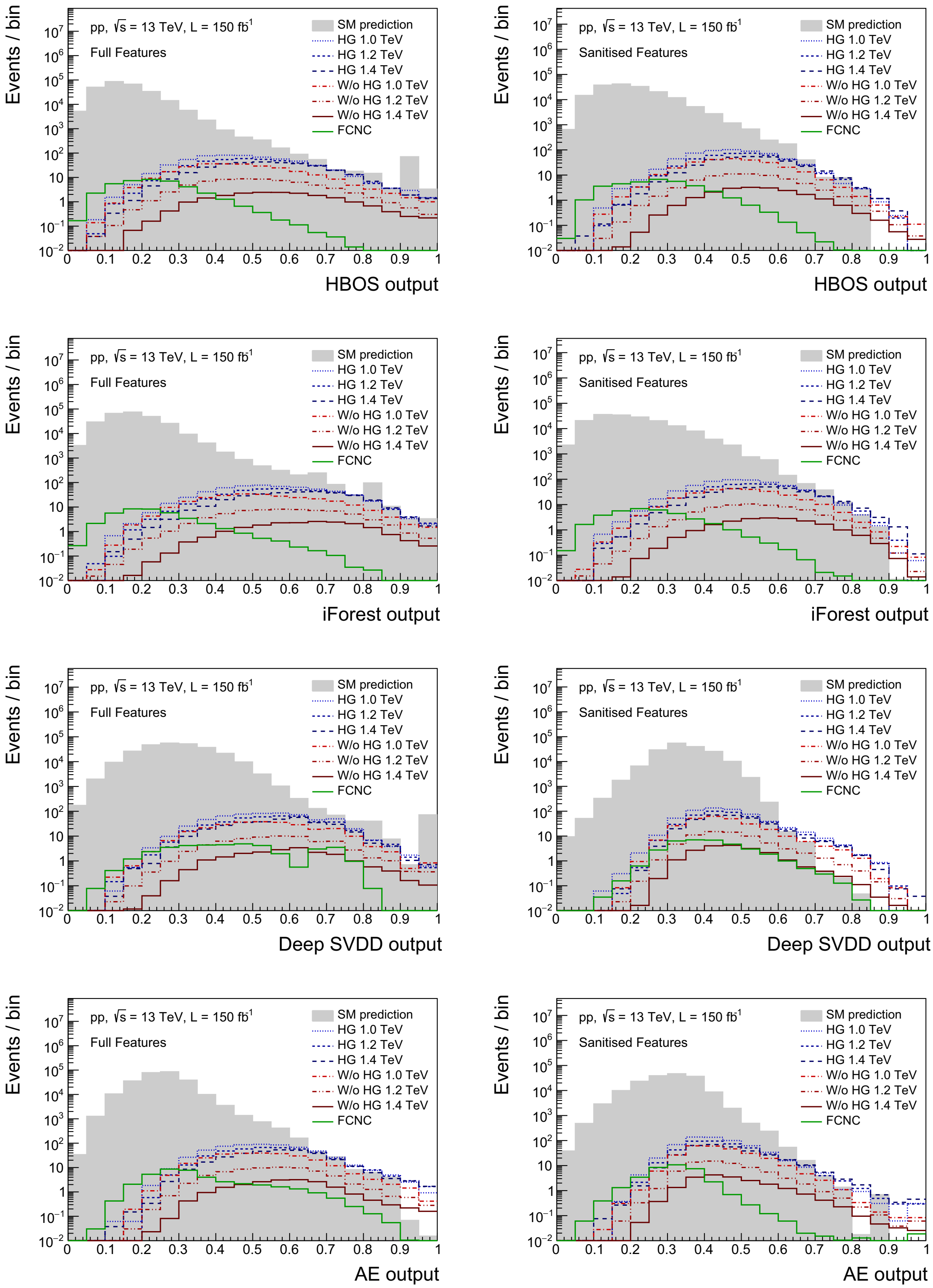

Fig. 1 Distribution of the AD discriminant for the SM prediction and each signal type: tZ production by FCNC, $T\bar{T}$ production via heavy gluon or without heavy gluon for $m_T = \{1.0, 1.2, 1.4\}$ TeV. The distributions are normalised to the generation cross-section and to an integrated luminosity of 150 fb^{-1}. Left: Using all features set. Right: Using sanitised features set

Table 1 95% CL upper limit on the signal strength μ of each benchmark signal for the different AD methods using the full feature set and the sanitised set and for a dedicated supervised DNN model trained on the full feature set. The statistical uncertainties, including the effect from limited statistics in the simulated datasets, are also shown

Model	Benchmark signal						
	FCNC	HG			No HG		
		1.0 TeV	1.2 TeV	1.4 TeV	1.0 TeV	1.2 TeV	1.4 TeV
Full features							
Supervised DNN	$2.9^{+1.4}_{-0.9}$	$0.09^{+0.04}_{-0.03}$	$0.3^{+0.2}_{-0.1}$	$0.17^{+0.07}_{-0.06}$	$0.26^{+0.13}_{-0.08}$	$1.9^{+1.3}_{-0.8}$	$2.3^{+1.1}_{-0.7}$
H_T	60^{+20}_{-20}	$0.27^{+0.14}_{-0.09}$	$0.3^{+0.2}_{-0.1}$	$0.29^{+0.16}_{-0.09}$	$0.8^{+0.5}_{-0.2}$	$1.9^{+0.9}_{-0.7}$	$3.2^{+1.7}_{-1.0}$
Deep SVDD	6^{+3}_{-1}	$0.4^{+0.1}_{-0.1}$	$0.4^{+0.2}_{-0.1}$	$0.5^{+0.2}_{-0.1}$	$0.9^{+0.4}_{-0.3}$	$2.6^{+1.2}_{-0.8}$	7^{+4}_{-2}
AE	20^{+4}_{-9}	$0.25^{+0.13}_{-0.08}$	$0.26^{+0.13}_{-0.08}$	$0.28^{+0.13}_{-0.09}$	$0.6^{+0.2}_{-0.2}$	$1.4^{+0.7}_{-0.4}$	4^{+1}_{-1}
HBOS	60^{+20}_{-20}	$0.3^{+0.2}_{-0.1}$	$0.4^{+0.2}_{-0.1}$	$0.4^{+0.2}_{-0.1}$	$0.8^{+0.4}_{-0.2}$	$2.2^{+1.0}_{-0.7}$	5^{+3}_{-1}
iForest	70^{+30}_{-20}	$0.4^{+0.1}_{-0.2}$	$0.4^{+0.2}_{-0.1}$	$0.5^{+0.2}_{-0.2}$	$0.9^{+0.4}_{-0.3}$	$2.3^{+1.3}_{-0.7}$	6^{+4}_{-2}
Sanitised features							
Supervised DNN	$2.8^{+1.3}_{-0.9}$	$0.22^{+0.18}_{-0.1}$	$0.3^{+0.2}_{-0.1}$	$0.4^{+0.2}_{-0.2}$	$0.5^{+0.5}_{-0.2}$	$1.8^{+1.4}_{-0.8}$	5^{+5}_{-2}
H_T	50^{+20}_{-10}	$0.27^{+0.14}_{-0.09}$	$0.3^{+0.16}_{-0.1}$	$0.29^{+0.16}_{-0.09}$	$0.8^{+0.5}_{-0.2}$	$1.8^{+1.0}_{-0.5}$	3^{+2}_{-1}
Deep SVDD	6^{+3}_{-2}	$0.19^{+0.08}_{-0.05}$	$0.21^{+0.1}_{-0.05}$	$0.24^{+0.11}_{-0.06}$	$0.36^{+0.16}_{-0.09}$	$1.1^{+0.5}_{-0.3}$	$3.6^{+1.5}_{-0.9}$
AE	60^{+30}_{-20}	$0.9^{+0.5}_{-0.3}$	$0.8^{+0.4}_{-0.3}$	$0.6^{+0.4}_{-0.2}$	$1.6^{+1.0}_{-0.5}$	4^{+2}_{-1}	9^{+5}_{-3}
HBOS	60^{+20}_{-20}	$0.5^{+0.3}_{-0.2}$	$0.5^{+0.3}_{-0.2}$	$0.5^{+0.3}_{-0.2}$	$1.0^{+0.5}_{-0.4}$	$2.4^{+1.5}_{-0.8}$	6^{+3}_{-2}
iForest	70^{+30}_{-20}	$0.5^{+0.2}_{-0.2}$	$0.5^{+0.2}_{-0.2}$	$0.4^{+0.2}_{-0.1}$	$1.1^{+0.5}_{-0.4}$	$2.4^{+1.2}_{-0.8}$	5^{+3}_{-2}

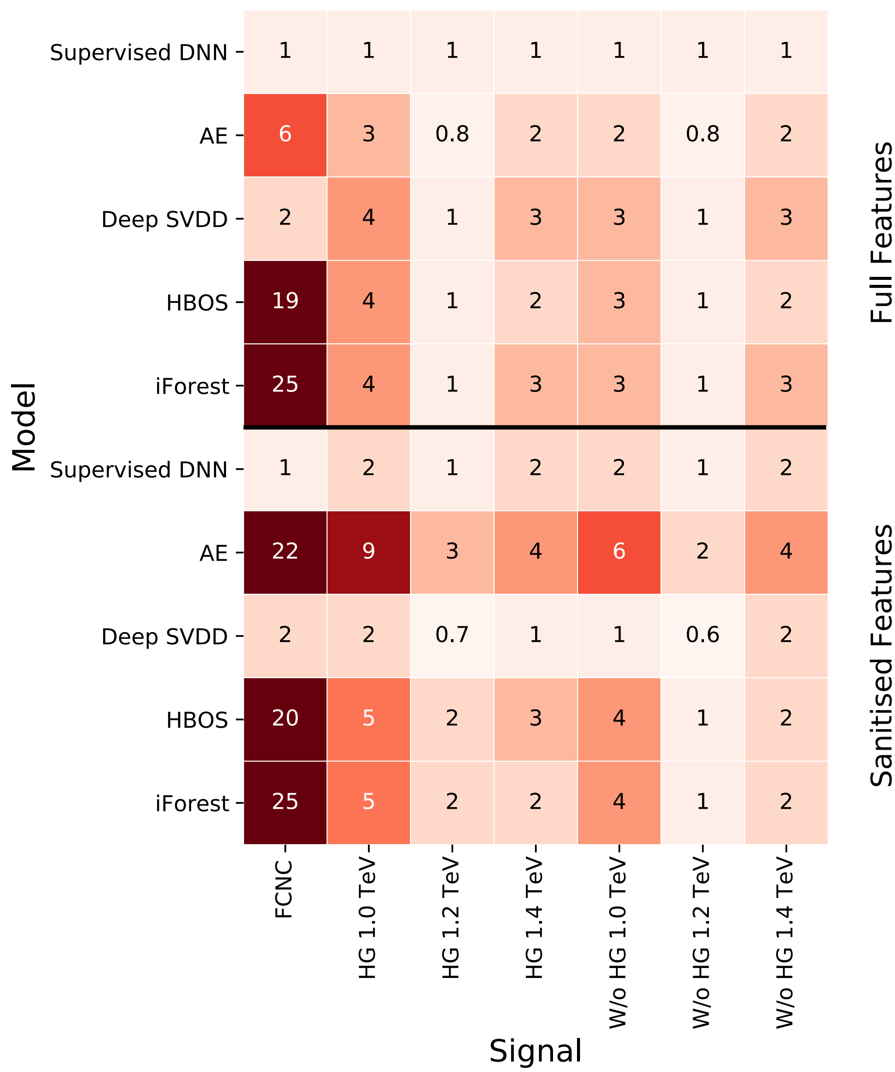

Fig. 2 95% CL upper limits on μ normalised to the limit obtained for the supervised DNN model

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