Eur. Phys. J. C (2024) 84:156
https://doi.org/10.1140/epjc/s10052-024-12458-6

THE EUROPEAN PHYSICAL JOURNAL C

Erratum

Erratum to: Observation of four-top-quark production in the multilepton final state with the ATLAS detector

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Received: 23 September 2023 / Accepted: 30 September 2023 / Published online: 15 February 2024
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Erratum to: Eur. Phys. J. C (2023) 83:496
https://doi.org/10.1140/epjc/s10052-023-11573-0

Corrections to two figures, one table and the corresponding numbers in the text are noted for the paper. Systematic uncertainties arising from the comparison of the nominal $t\bar{t}t\bar{t}$ simulation with alternative samples generated with SHERPA and with MADGRAPH5_AMC@NLO+HERWIG7 were not applied when deriving limits on the top-quark Yukawa coupling, Higgs oblique parameter and EFT operators. This affects Figs. 8 and 9, and Table 8.
The changes in the text are noted for Sects. 9.1, 9.2 and 10.

- In Sect. 9.1, for the case when the $t\bar{t}t\bar{t}$ and $t\bar{t}H$ yields in each bin of the GNN distribution are parameterised as a function of κ_t and α and fixing the top-quark Yukawa coupling to be CP-even only, the observed limit is $|\kappa_t| < 1.9$ instead of $|\kappa_t| < 1.8$. If the $t\bar{t}H$ background yields are not parametrised, whilst the normalisation of the $t\bar{t}H$ background is treated as a free parameter of the fit, the observed (expected) limit is $|\kappa_t| < 2.3$ (1.9) instead of $|\kappa_t| < 2.2$ (1.8).
- In Sect. 9.2, the upper limits on the absolute values of the coefficients ($|C_i/\Lambda^2|$) of O^1_{QQ}, O^1_{Qt}, O^1_{tt} and O^8_{Qt} assuming only the linear terms are 6.6, 4.0, 2.8 and 10.8 TeV $^{-2}$, respectively, at 95% CL instead of 5.3, 3.3, 2.4 and 8.8 TeV $^{-2}$.
- In Sect. 9.2, the observed (expected) upper limit on the $\hat{H}$ parameter is 0.23 (0.11) at 95% CL instead of 0.20 (0.12). The published expected upper limit of 0.12 was a mistake in the text and should have been 0.1 corresponding to the likelihood scan in Fig. 9. The observed limit is weaker than the largest value of this parameter equal to 0.2 that preserves unitarity in the perturbative theory.
- In Sect. 10, assuming a pure CP-even coupling ($\alpha = 0$), the observed upper limit on $|\kappa_t| = |y_t/y_t^{\mathrm{SM}}|$ at 95% CL is 1.9 instead of 1.8. Assuming one operator taking effect at a time, the observed constraints on the coefficients (C_i/Λ^2) of O^1_{QQ}, O^1_{Qt}, O^1_{tt} and O^8_{Qt} are $[-4.0, 4.5]$, $[-3.8, 3.4]$, $[-1.9, 2.1]$ and $[-6.9, 7.6]$ TeV $^{-2}$, respectively. An observed upper limit at 95% CL of 0.23 is obtained for the Higgs oblique parameter that is weaker than the largest value that preserves unitarity in the perturbative theory.

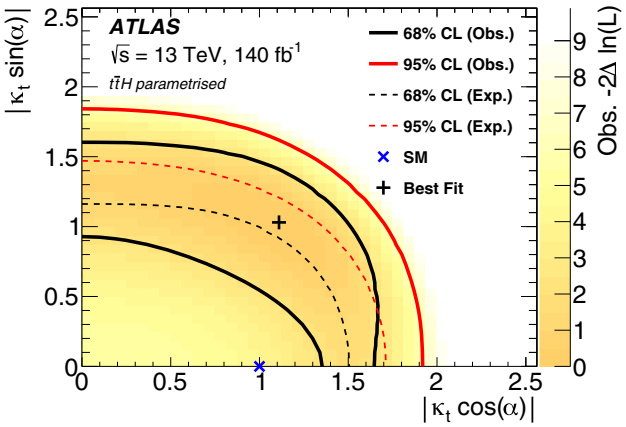

Fig. 8 Two-dimensional negative log-likelihood contours for $|\kappa_t \cos(\alpha)|$ versus $|\kappa_t \sin(\alpha)|$ at 68% and 95%, where κ_t is the top-Higgs Yukawa coupling strength parameter and α is the mixing angle between the CP-even and CP-odd components. The gradient-shaded area represents the observed likelihood value as a function of κ_t and α. Both the $t\bar{t}t\bar{t}$ signal and $t\bar{t}H$ background yields in each fitted bin are parameterised as a function of κ_t and α. The blue cross shows the SM expectation, while the black cross shows the best fit value

The original article can be found online at https://doi.org/10.1140/epjc/s10052-023-11573-0.

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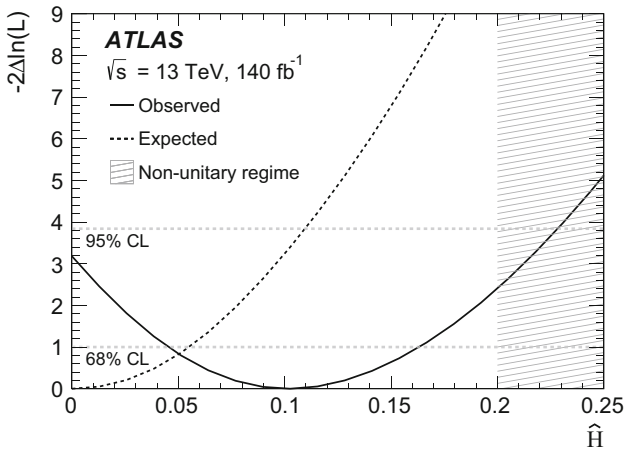

Fig. 9 The negative log-likelihood values as a function of the Higgs oblique parameter $\hat{H}$. The solid line represents the observed likelihood while the dashed line corresponds to the expected one. The dashed region shows the non-unitary regime

Table 8 Expected and observed 95% CL intervals on EFT coupling parameters assuming one EFT parameter variation in the fit

Operators	Expected C_i/Λ^2 [TeV $^{-2}$]	Observed C_i/Λ^2 [TeV $^{-2}$]
$\mathcal{O}^1_{QQ}$	$[-2.5, 3.2]$	$[-4.0, 4.5]$
$\mathcal{O}^1_{Qt}$	$[-2.6, 2.1]$	$[-3.8, 3.4]$
$\mathcal{O}^1_{tt}$	$[-1.2, 1.4]$	$[-1.9, 2.1]$
$\mathcal{O}^8_{Qt}$	$[-4.3, 5.1]$	$[-6.9, 7.6]$

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Funded by SCOAP[3].

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