

Erratum: Search for $t\bar{t}H/A \rightarrow t\bar{t}t\bar{t}$ production in the multilepton final state in proton–proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector



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Correction to one figure and the corresponding numbers in the text are noted for the paper. A wrong cross-section was used for the theory prediction of $t\bar{t}A(\rightarrow t\bar{t})$, which was estimated to differ by around 1% with respect to the one of $t\bar{t}H(\rightarrow t\bar{t})$. It was found later that the production cross-section for $t\bar{t}A(\rightarrow t\bar{t})$ can be up to 60% higher than the one of $t\bar{t}H(\rightarrow t\bar{t})$ for $\tan\beta \sim 1$. This affects the theoretical prediction shown in figure 7, and the limits in the $\tan\beta$ vs $m_{H/A}$ plane shown in figure 8(a).

The changes in the text are noted for sections 8 and 9.

- In the scenario where the scalar H and pseudo-scalar A bosons have equal masses and both contribute to BSM $t\bar{t}t\bar{t}$ production, values of $\tan\beta$ below 1.9 and 0.7 are excluded for $m_{H/A}$ between 400 GeV and 1000 GeV, respectively, at 95% CL instead of 1.6 and 0.6.
- In the scenario where only the pseudo-scalar A boson contributes to BSM $t\bar{t}t\bar{t}$ production, values of $\tan\beta$ below 1.5 and 0.5 are excluded for m_A between 400 GeV and 1000 GeV, respectively, at 95% CL instead of 1.2 and 0.5. The original plot for this scenario is not included in the paper as it was nearly identical to the one where only the scalar H boson contributes to BSM $t\bar{t}t\bar{t}$ production, and was therefore omitted. After correction, the updated limits in the $\tan\beta$ vs m_A plane are shown in figure 8(c).

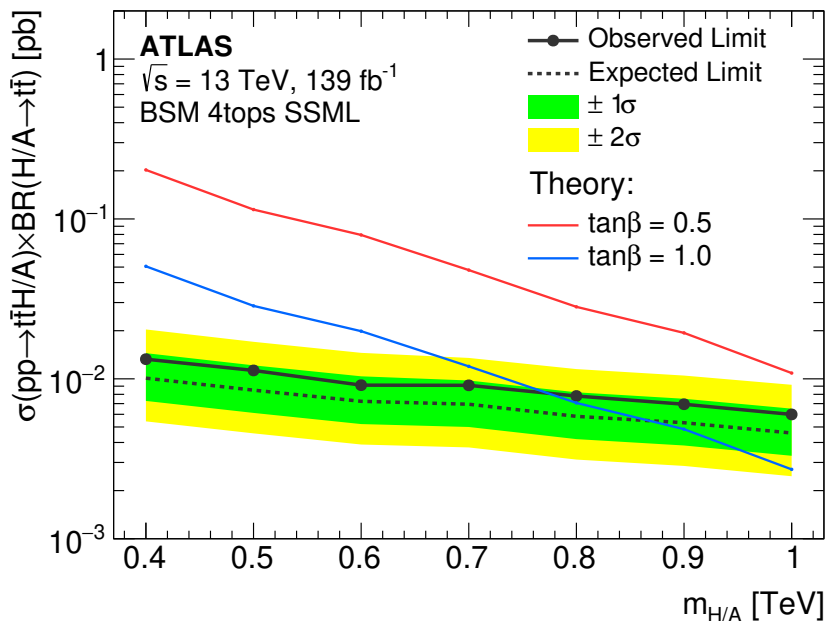
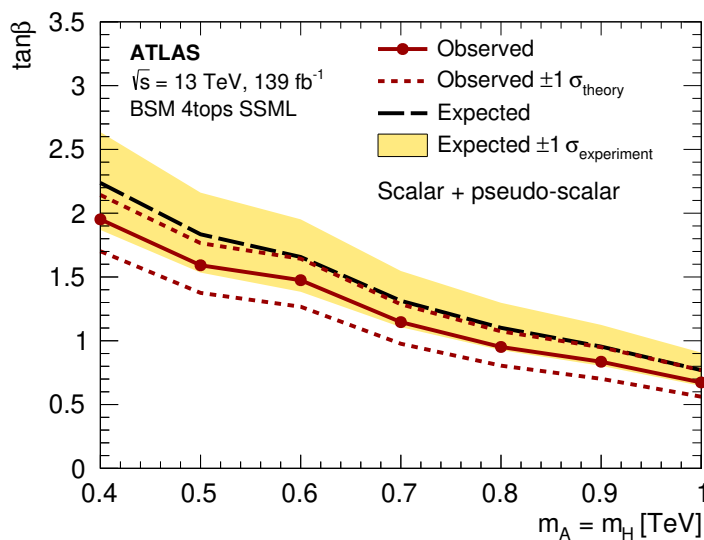
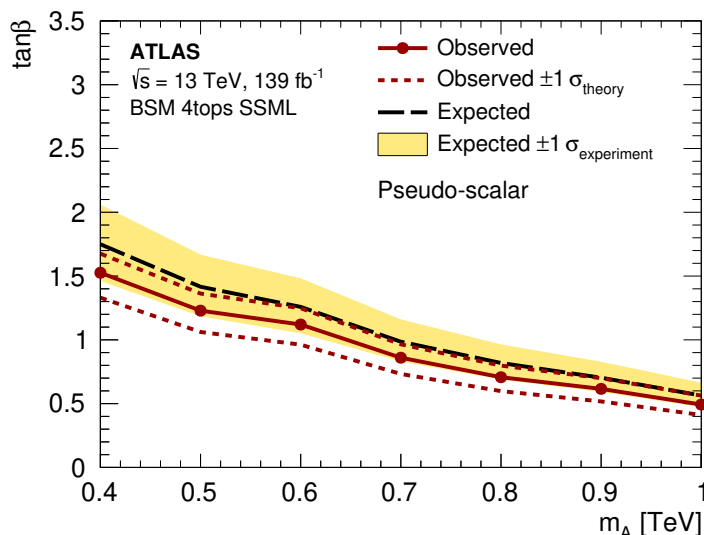


Figure 7. Observed (black solid line) and expected (black dashed line) 95% CL upper limits on the $t\bar{t}H/A$ cross-section times branching fraction of $H/A \rightarrow t\bar{t}$ as a function of $m_{H/A}$. The limits are estimated assuming that both a heavy scalar H boson and a pseudo-scalar A boson contribute to the $t\bar{t}t\bar{t}$ final state and have the same mass $m_H = m_A$. The green (yellow) band shows the $\pm 1\sigma$ ($\pm 2\sigma$) variation of the expected limits. Theoretical predictions for two values of $\tan\beta$ are shown.



(a)

Figure 8. Observed (red line) and expected (black dashed line) exclusion regions at 95% CL in the $\tan\beta$ vs $m_{H/A}$ plane assuming that both a heavy scalar H boson and heavy pseudo-scalar A boson contribute to the $t\bar{t}t\bar{t}$ final state and have the same mass $m_H = m_A$. The yellow band shows the $\pm 1\sigma$ variation of the expected exclusion limit. The region below the red solid line is excluded at 95% CL. The exclusion regions are derived in the context of a type-II 2HDM. Variations of the theory cross-section are also shown as dashed red lines.



(c)

Figure 8. Observed (red line) and expected (black dashed line) exclusion regions at 95% CL in the $\tan\beta$ vs m_A plane assuming that only the pseudo-scalar A boson contributes to the $t\bar{t}t\bar{t}$ final state. The yellow band shows the $\pm 1\sigma$ variation of the expected exclusion limit. The region below the red solid line is excluded at 95% CL. The exclusion regions are derived in the context of a type-II 2HDM. Variations of the theory cross-section are also shown as dashed red lines.

Data Availability Statement. This article has no associated data or the data will not be deposited.

Code Availability Statement. This article has no associated code or the code will not be deposited.

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