Heavy Higgs Analysis

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Heavy Higgs K-factors 1/2

The K-factors have been derived with sushi-1.6.1, using 2HDMC-1.7.0 to derive m_{12} and $s_{\beta-\alpha}$ for the appropriate value of $\tan(\beta)$ corresponding to the Heavy Higgs width. Comparing with the existing K-factors I get a discrepancy of 4.38 % consistent for both scalar and pseudoscalar at mass 500GeV and width 2.5 %. Using the existing K-factors I derived the SM K-factor to be 1.5732.
The PDFs used are NNPDF31_nnlo_as_0118_nf_4, NNPDF31_nlo_as_0118_nf_4, NNPDF_lo_as_0118. Also tried with NNPDF30_(nn)lo_as_0118 without noticing any significant difference.

Heavy Higgs K-factors 2/2

Higgs Type	K-factor resonance	K-factor interference
A500RW2.5%	2.08818	1.81250
A365RW1.9%	2.37911	1.93464
A400RW3.0%	2.23980	1.87714
A600RW4.8%	2.00347	1.77535
A800RW5.3%	2.00188	1.77464
A1000RW5.5%	1.90412	1.73077

Table: List of K-factors for pseudoscalar Heavy Higgs.

Higgs Type	K-factor resonance	K-factor interference
H500RW2.5%	2.11036	1.82209
H365RW0.2%	2.26943	1.88952
H400RW0.8%	2.23538	1.87529
H600RW3.2%	2.03168	1.78781
H800RW4.3%	1.93531	1.74489
H1000RW4.8%	1.87481	1.71740

Table: List of K-factors for scalar Heavy Higgs.

Limits for Pseudoscalar Heavy Higgs with Smoothing and K-factors

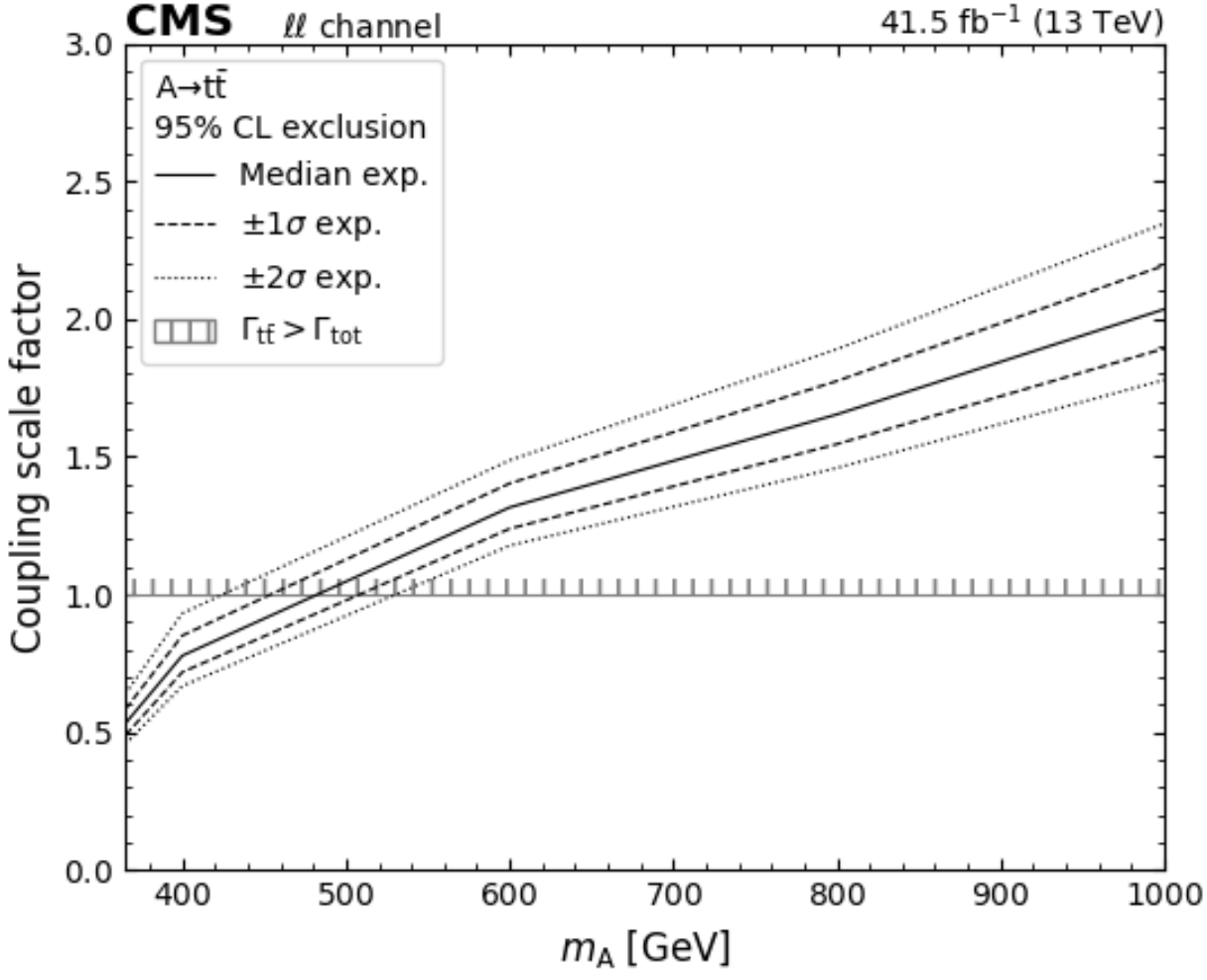
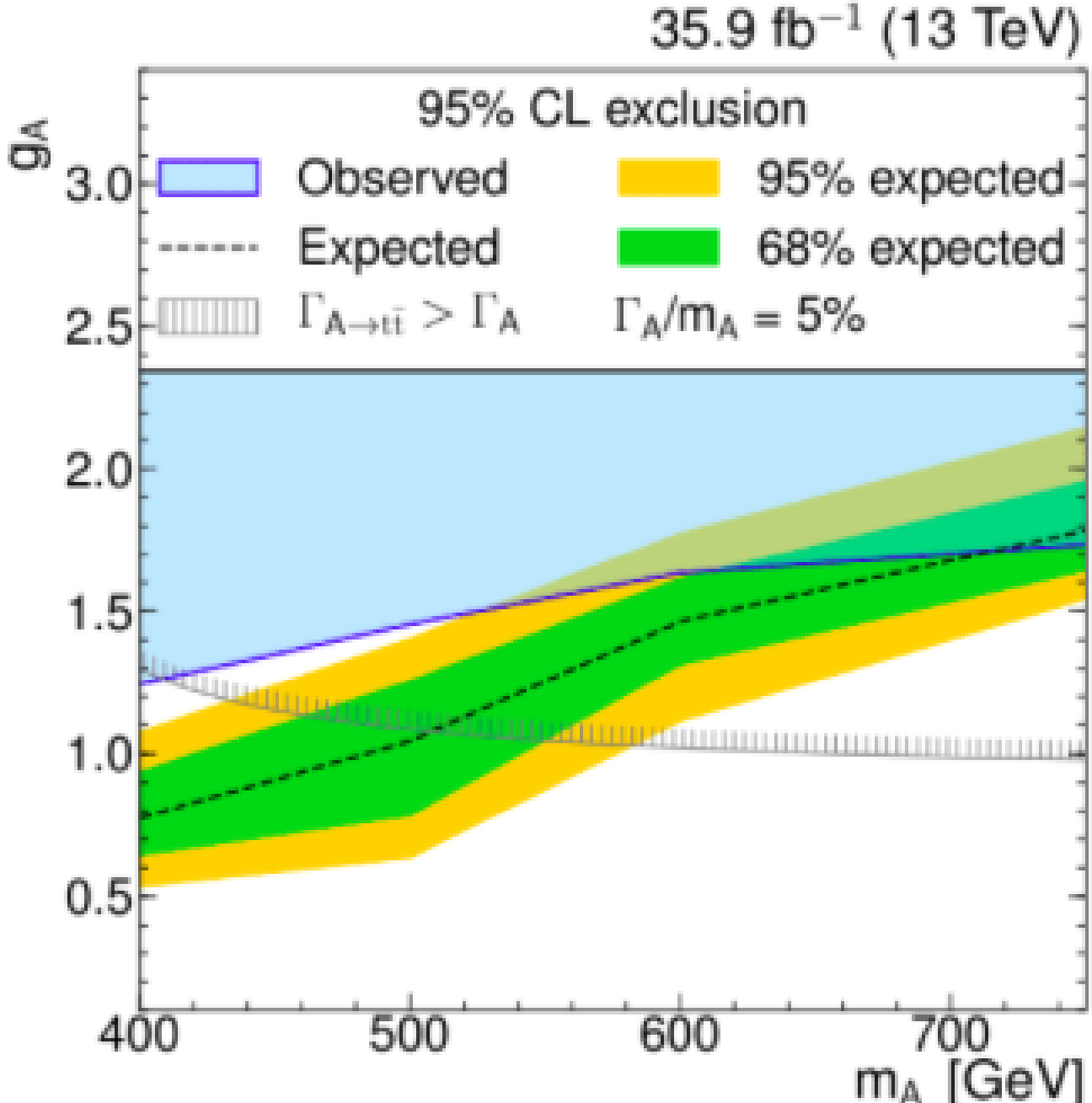


Figure: Expected limit for natural widths.

Limt from Afiq's thesis.



Limits for Scalar Heavy Higgs with Smoothing and K-factors

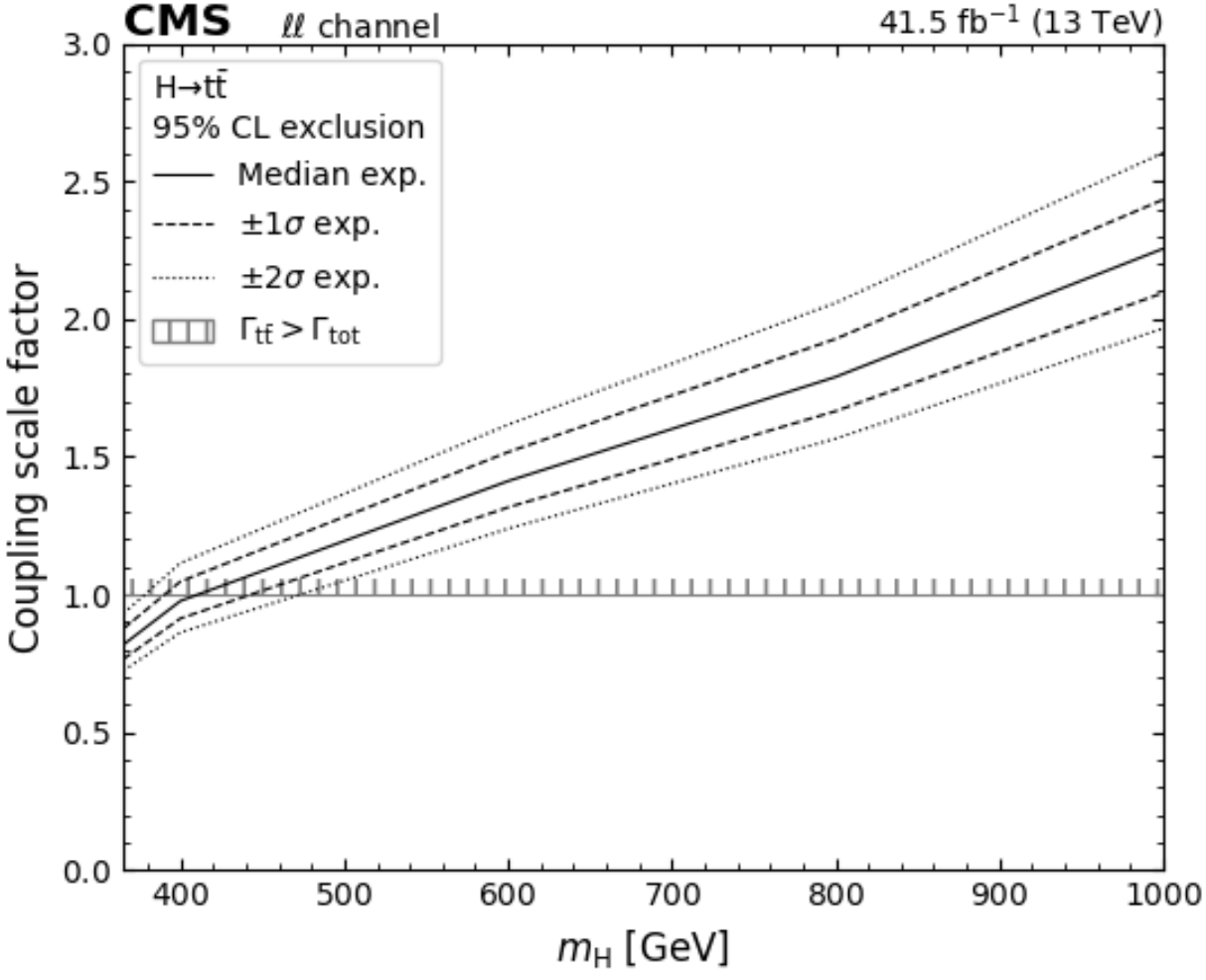


Figure: Expected limit for natural widths.