

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. In Madgraph5MC@nlo I calculated cross sections for $gg \rightarrow A/H$, using the exact values for width and g derived from sushi, and got cross sections that were 5-10 % lower than the LO cross sections from sushi. Since we are scaling madgraph to NNLO in sushi, I therefore replaced the LO reference for deriving new K-factors. The PDFs used are NNPDF31_nnlo_as_0118_nf_4, NNPDF31_nlo_as_0118_nf_4, NNPDF31_lo_as_0118.

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Higgs Type	K-factor resonance	K-factor interference
A365RW1.9%	2.50076	1.98348
A400RW3.0%	2.37786	1.93413
A500RW2.5%	2.25584	1.88385
A600RW4.8%	2.18698	1.85488
A800RW5.3%	2.12482	1.82833
A1000RW5.5%	2.08649	1.81176

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

Higgs Type	K-factor resonance	K-factor interference
H365RW0.2%	2.52968	1.99492
H400RW0.8%	2.39676	1.94180
H500RW2.5%	2.26777	1.88883
H600RW3.2%	2.20193	1.86120
H800RW4.3%	2.12818	1.82977
H1000RW4.8%	2.08801	1.81242

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

Widths for Pseudoscalar Heavy Higgs

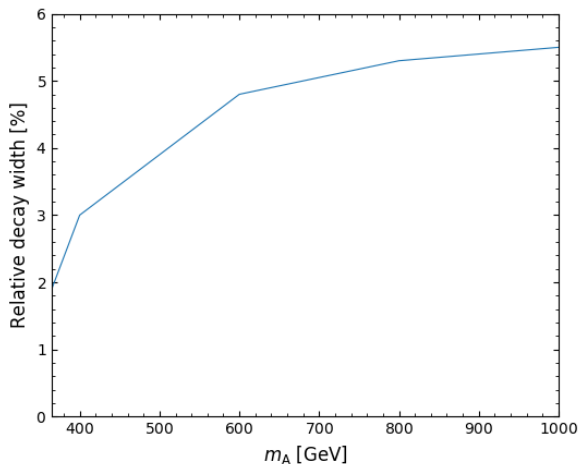


Figure: Natural widths.

Limits for Pseudoscalar Heavy Higgs with Smoothing and K-factors

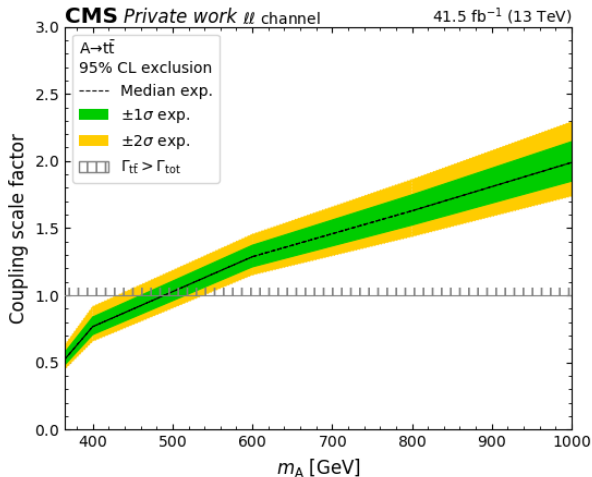
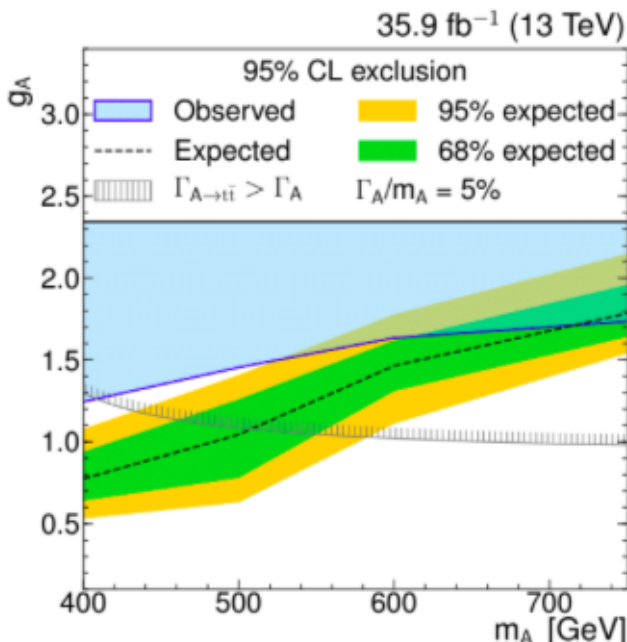


Figure: Expected limit for natural widths.

Limit from Afq's thesis.



Widths for Scalar Heavy Higgs

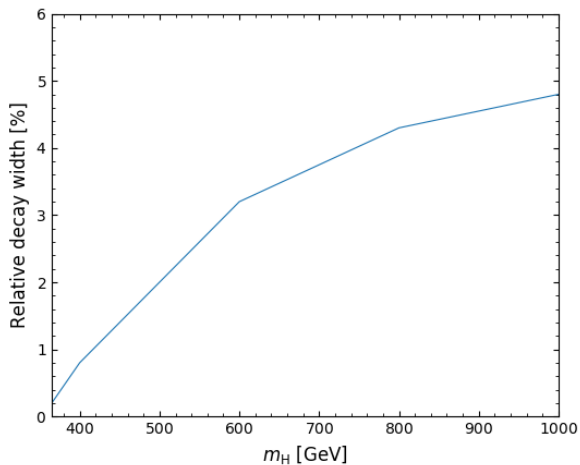


Figure: Natural widths.

Limits for Scalar Heavy Higgs with Smoothing and K-factors

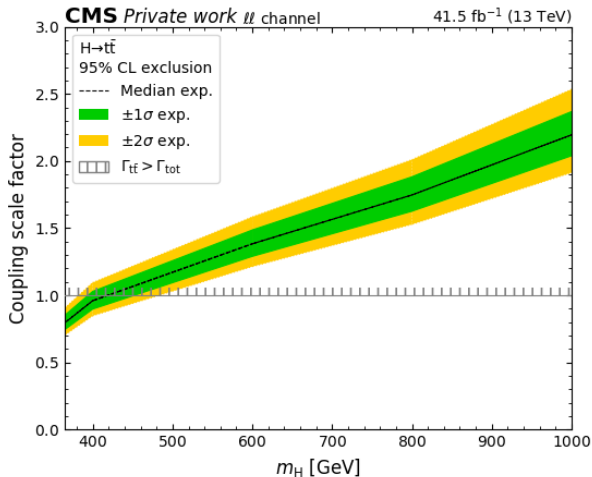


Figure: Expected limit for natural widths.