Physics beyond the Standard Model

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Exercise Sheet 6

Discussion: Fr, 12.12.14

Exercise 8: Higgs branching ratios

For the calculation of branching ratios of the various Higgs bosons, one can use public computer codes, which also include higher-order corrections.

- (a) Download and install one of the codes mentioned in the lecture and read the accompanying manual to see how to set the parameters and run the code.
- (b) Determine the branching ratios.

Produce plots for the branching ratios of H^0 , A^0 and H^{\pm} as a function of their mass. Choose $M_h = 125$ GeV, $\sin(\beta - \alpha) = 0.9$ (to be close to the SM) and two values of $\tan \beta$, $\tan \beta = 2$, 10. For the time being, we are not interested in Higgs-to-Higgs decays, so that m_{12}^2 can be chosen arbitrarily. For simplicity, choose H^0 , A^0 and H^{\pm} to be close in mass.

Are there any distinct features?

How do the plots change for the four different models with specific Yukawa patterns?

