

# Chapter 1

## Interpretation of Results in Terms of GMSB Models

As shown in Figs. ?? and ?? and Tables ?? and ??, no excess of events above the Standard Model expectation is found in either the  $\geq 0$ - or  $\geq 1$ -jet analyses for the GMSB-sensitive region  $\cancel{E}_T \geq 50$  GeV. Therefore, upper limits on the production cross sections  $\times \mathcal{BR}(\tilde{\chi}_1^0 \rightarrow \gamma \tilde{\mathbf{G}})^2$  of various GMSB models are calculated and then translated into statements of exclusion. Section 1.1 describes the GMSB models that were generated with MC and tested for exclusion. The upper limit calculation is laid out in Section 1.2, and the translation to model exclusions is described in Section 1.3. The upper limits themselves are presented in Section 1.4, and, finally, the exclusions are presented in Section 1.5.

### 1.1 Simplified Models

### 1.2 Upper Limit Calculation

The upper limits are calculated according to the prescription followed for the 2011 ATLAS + CMS Higgs limit combination [?]. This prescription utilizes the frequentist

CL<sub>s</sub> method [?] with profile likelihood test statistic [?]. The CL<sub>s</sub> method and the profile likelihood are explained in Section 1.2.2, using specific signal MC points to illustrate the procedure. First, however, the signal MC acceptance  $\times$  efficiency, which is an input to the limit setting procedure, is presented in Section 1.2.1.

### **1.2.1 Signal Acceptance $\times$ Efficiency**

### **1.2.2 CL<sub>s</sub> and the Profile Likelihood Test Statistic**

## **1.3 Translation of Upper Limits to Model Exclusions**

## **1.4 Cross Section Upper Limits**

## **1.5 Exclusion Contours**