

# Measurements of $H \rightarrow b\bar{b}$ decays and $VH$ production

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# Contents

<b>List of Figures</b>	<b>4</b>
<b>List of Tables</b>	<b>4</b>
<b>1 Background Modelling</b>	<b>5</b>
1.1 Categorisation into Analysis Regions . . . . .	5
Top $e\mu$ control region . . . . .	5
$\Delta R(b, b)$ Control Regions . . . . .	5
1.2 Novel Modelling Techniques . . . . .	5
Multi-dimensional re-weighting . . . . .	5
Inferring missing information with parametrised neural networks . .	5
1.3 Z + jets modelling . . . . .	5

1.4	Modelling of other backgrounds . . . . .	5
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## List of Figures

## List of Tables

1.1	A summary of the Sherpa 2.2.1 and Sherpa 2.1 internal variations that are used to model V + jets processes. . . . .	6
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# Chapter 1

## Background Modelling

### 1.1 Categorisation into Analysis Regions

Top  $e\mu$  control region

$\Delta R(b, b)$  Control Regions

### 1.2 Novel Modelling Techniques

Multi-dimensional re-weighting

Inferring missing information with parametrised neural networks

### 1.3 Z + jets modelling

### 1.4 Modelling of other backgrounds

Variation	Values	
<b>Sherpa 2.2.1</b>		
Factorisation scale ( $\mu_F$ )	$2\mu_F$	$0.5\mu_F$
Renormalisation scale ( $\mu_R$ )	$2\mu_R$	$0.5\mu_R$
PDF Variation	MMHT2014nnlo68cl	CT14nnlo
<b>Sherpa 2.1</b>		
Re-summation scale ( $\mu_S$ )	$2\mu_S$	$0.5\mu_S$
CKKW Merging scale	15 GeV	30 GeV

Table 1.1: A summary of the Sherpa 2.2.1 and Sherpa 2.1 internal variations that are used to model V + jets processes.