Table 1: Event type compositons of single muon selection in background MC samples

α_T range	$\alpha_T > 0.55$			
HT (GeV)	275–325	325–375	375–475	475–575
Translation factor (τ_h)	1.1 ± 0.2	1.0 ± 0.3	1.1 ± 0.1	0.9 ± 0.1
Control Data (τ_h)	27.0 ± 5.2	6.0 ± 2.4	18.0 ± 4.2	14.0 ± 3.7
Predicted BG (τ_h)	31.0 ± 8.6	6.0 ± 3.2	20.1 ± 4.9	13.0 ± 3.8
Translation factor (non-τ_h)	2.1 ± 0.2	1.7 ± 0.2	1.9 ± 0.1	1.9 ± 0.1
Control Data (non-τ_h)	337.0 ± 18.4	148.0 ± 12.2	138.0 ± 11.7	31.0 ± 5.6
Predicted BG (non-τ_h)	694.8 ± 78.4	246.6 ± 41.1	262.9 ± 23.7	59.5 ± 11.2
Total Predicted BG	725.8 ± 78.9	252.6 ± 41.2	283.0 ± 24.2	72.5 ± 11.8
Data Hadronic Yield	784.0 ± 28.0	320.0 ± 17.9	239.0 ± 15.5	46.0 ± 6.8
HT (GeV)	575–675	675–775	7755–875	875–∞
Translation factor (τ_h)	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.3	0.2 ± 0.1
Control Data (τ_h)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (τ_h)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Translation factor (non-τ_h)	2.0 ± 0.2	1.7 ± 0.3	2.1 ± 0.6	1.9 ± 0.6
Control Data (non-τ_h)	5.0 ± 2.2	1.0 ± 1.0	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (non-τ_h)	10.2 ± 4.6	1.7 ± 1.7	0.0 ± 0.0	0.0 ± 0.0
Total Predicted BG	10.2 ± 4.6	1.7 ± 1.7	0.0 ± 0.0	0.0 ± 0.0
Data Hadronic Yield	20.0 ± 4.5	6.0 ± 2.4	2.0 ± 1.4	0.0 ± 0.0
α_T range	$0.53 < \alpha_T \leq 0.55$			
	575–675	675–775	7755–875	875–∞
Translation factor (τ_h)	0.2 ± 0.1	0.5 ± 0.3	0.3 ± 0.2	0.2 ± 0.2
Control Data (τ_h)	3.0 ± 1.7	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Control Data (τ_h)	0.7 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (τ_h)	2.8 ± 0.6	2.5 ± 0.8	1.8 ± 1.0	2.2 ± 1.3
Translation factor (non-τ_h)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (non-τ_h)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Total Predicted BG	0.7 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Data Hadronic Yield	5.0 ± 2.2	0.0 ± 0.0	0.0 ± 0.0	1.0 ± 1.0
α_T range	$0.52 < \alpha_T \leq 0.53$			
HT (GeV)			7755–875	875–∞
Translation factor (τ_h)	–	–	0.2 ± 0.2	0.0 ± 0.0
Control Data (τ_h)	–	–	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (τ_h)	–	–	0.0 ± 0.0	0.0 ± 0.0
Translation factor (non-τ_h)	–	–	5.3 ± 3.1	2.8 ± 1.8
Control Data (non-τ_h)	–	–	0.0 ± 0.0	0.0 ± 0.0
Predicted BG (non-τ_h)	–	–	0.0 ± 0.0	0.0 ± 0.0
Total Predicted BG	–	–	0.0 ± 0.0	0.0 ± 0.0
Data Hadronic Yield	–	–	0.0 ± 0.0	1.0 ± 1.0