

| Search region bin                                   | HH              | ZH              | WH (200,1)      | b (450, 1)      | b̄ (450,300)    |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| 0j, $\geq 0b$ , $p_T^0$                             | $3.9 \pm 0.6$   | $2.9 \pm 0.5$   | $2.6 \pm 0.3$   | $2.7 \pm 0.1$   | $0.0 \pm 0.0$   |
| 0j, $\geq 0b$ , $p_T^{75}$                          | $2.4 \pm 0.3$   | $2.1 \pm 0.2$   | $1.8 \pm 0.2$   | $0.54 \pm 0.02$ | $0.0 \pm 0.0$   |
| 0j, $\geq 0b$ , $p_T^{125}$                         | $1.7 \pm 0.2$   | $2.7 \pm 0.4$   | $1.7 \pm 0.2$   | $0.15 \pm 0.01$ | $0.01 \pm 0.00$ |
| 1-3j, 0b, $p_T^0$ , $M_{T2}^0$                      | $4.7 \pm 0.8$   | $2.7 \pm 0.4$   | $2.9 \pm 0.3$   | $4.2 \pm 0.5$   | $0.03 \pm 0.00$ |
| 1-3j, 0b, $p_T^0$ , $M_{T2}^{30}$                   | $4.7 \pm 0.5$   | $2.6 \pm 0.3$   | $2.1 \pm 0.2$   | $1.6 \pm 0.3$   | $0.03 \pm 0.01$ |
| 1-3j, 0b, $p_T^{75}$ , $M_{T2}^0$                   | $9.0 \pm 1.5$   | $5.1 \pm 0.9$   | $3.1 \pm 0.6$   | $0.73 \pm 0.15$ | $0.27 \pm 0.05$ |
| 1-3j, 0b, $p_T^{75}$ , $M_{T2}^{30}$                | $0.21 \pm 0.04$ | $0.10 \pm 0.02$ | $0.10 \pm 0.01$ | $0.34 \pm 0.09$ | $0.04 \pm 0.01$ |
| 1-3j, 0b, $p_T^{125}$ , $M_{T2}^0$                  | $0.18 \pm 0.02$ | $0.10 \pm 0.01$ | $0.07 \pm 0.01$ | $0.15 \pm 0.04$ | $0.05 \pm 0.01$ |
| 1-3j, 0b, $p_T^{125}$ , $M_{T2}^{30}$               | $0.66 \pm 0.14$ | $0.35 \pm 0.07$ | $0.19 \pm 0.04$ | $0.14 \pm 0.03$ | $0.35 \pm 0.07$ |
| 1-3j, 1b, $p_T^0$ , $M_{T2}^0$                      | $6.1 \pm 0.9$   | $2.2 \pm 0.3$   | $1.1 \pm 0.1$   | $7.1 \pm 1.0$   | $0.12 \pm 0.02$ |
| 1-3j, 1b, $p_T^0$ , $M_{T2}^{30}$                   | $6.6 \pm 0.6$   | $2.4 \pm 0.2$   | $0.81 \pm 0.06$ | $3.4 \pm 0.3$   | $0.20 \pm 0.02$ |
| 1-3j, 1b, $p_T^{75}$ , $M_{T2}^0$                   | $13.7 \pm 2.1$  | $5.1 \pm 0.9$   | $1.4 \pm 0.2$   | $2.2 \pm 0.3$   | $1.7 \pm 0.2$   |
| 1-3j, 1b, $p_T^{75}$ , $M_{T2}^{30}$                | $0.23 \pm 0.03$ | $0.09 \pm 0.01$ | $0.08 \pm 0.01$ | $0.82 \pm 0.13$ | $0.27 \pm 0.04$ |
| 1-3j, 1b, $p_T^{125}$ , $M_{T2}^0$                  | $0.36 \pm 0.04$ | $0.13 \pm 0.01$ | $0.07 \pm 0.00$ | $0.39 \pm 0.06$ | $0.59 \pm 0.08$ |
| 1-3j, 1b, $p_T^{125}$ , $M_{T2}^{30}$               | $1.2 \pm 0.2$   | $0.47 \pm 0.09$ | $0.18 \pm 0.03$ | $0.37 \pm 0.05$ | $3.5 \pm 0.5$   |
| 1-3j, $\geq 2b$ , $p_T^0$ , $M_{T2}^0$              | $0.60 \pm 0.09$ | $0.21 \pm 0.04$ | $0.08 \pm 0.01$ | $1.9 \pm 0.2$   | $0.43 \pm 0.05$ |
| 1-3j, $\geq 2b$ , $p_T^0$ , $M_{T2}^{30}$           | $0.81 \pm 0.07$ | $0.27 \pm 0.02$ | $0.07 \pm 0.01$ | $1.2 \pm 0.1$   | $0.69 \pm 0.07$ |
| 1-3j, $\geq 2b$ , $p_T^{75}$ , $M_{T2}^0$           | $2.0 \pm 0.4$   | $0.67 \pm 0.11$ | $0.09 \pm 0.03$ | $0.98 \pm 0.12$ | $5.0 \pm 0.6$   |
| 1-3j, $\geq 2b$ , $p_T^{75}$ , $M_{T2}^{30}$        | $0.08 \pm 0.01$ | $0.03 \pm 0.01$ | $0.02 \pm 0.01$ | $0.38 \pm 0.04$ | $1.3 \pm 0.1$   |
| 1-3j, $\geq 2b$ , $p_T^{125}$ , $M_{T2}^0$          | $0.11 \pm 0.03$ | $0.04 \pm 0.00$ | $0.03 \pm 0.00$ | $0.28 \pm 0.03$ | $2.2 \pm 0.2$   |
| 1-3j, $\geq 2b$ , $p_T^{125}$ , $M_{T2}^{30}$       | $0.44 \pm 0.10$ | $0.16 \pm 0.03$ | $0.05 \pm 0.03$ | $0.37 \pm 0.03$ | $15.5 \pm 1.3$  |
| $\geq 4j$ , 0b, $p_T^0$ , $M_{T2}^0$                | $3.9 \pm 0.6$   | $3.1 \pm 0.5$   | $6.6 \pm 0.7$   | $3.3 \pm 0.8$   | $0.01 \pm 0.00$ |
| $\geq 4j$ , 0b, $p_T^0$ , $M_{T2}^{30}$             | $4.2 \pm 0.5$   | $3.4 \pm 0.4$   | $5.6 \pm 0.5$   | $1.2 \pm 0.2$   | $0.03 \pm 0.01$ |
| $\geq 4j$ , 0b, $p_T^{75}$ , $M_{T2}^0$             | $7.5 \pm 1.2$   | $6.9 \pm 1.2$   | $8.0 \pm 1.4$   | $0.56 \pm 0.11$ | $0.13 \pm 0.03$ |
| $\geq 4j$ , 0b, $p_T^{75}$ , $M_{T2}^{30}$          | $0.14 \pm 0.02$ | $0.10 \pm 0.01$ | $0.19 \pm 0.02$ | $0.52 \pm 0.11$ | $0.02 \pm 0.00$ |
| $\geq 4j$ , 0b, $p_T^{125}$ , $M_{T2}^0$            | $0.16 \pm 0.02$ | $0.13 \pm 0.02$ | $0.19 \pm 0.02$ | $0.25 \pm 0.05$ | $0.02 \pm 0.00$ |
| $\geq 4j$ , 0b, $p_T^{125}$ , $M_{T2}^{30}$         | $0.81 \pm 0.18$ | $0.50 \pm 0.11$ | $0.51 \pm 0.11$ | $0.27 \pm 0.05$ | $0.16 \pm 0.03$ |
| $\geq 4j$ , 1b, $p_T^0$ , $M_{T2}^0$                | $5.0 \pm 0.8$   | $2.3 \pm 0.3$   | $2.5 \pm 0.3$   | $5.1 \pm 0.9$   | $0.08 \pm 0.01$ |
| $\geq 4j$ , 1b, $p_T^0$ , $M_{T2}^{30}$             | $5.4 \pm 0.6$   | $2.5 \pm 0.2$   | $2.1 \pm 0.2$   | $2.3 \pm 0.2$   | $0.15 \pm 0.02$ |
| $\geq 4j$ , 1b, $p_T^{75}$ , $M_{T2}^0$             | $11.4 \pm 1.8$  | $5.5 \pm 0.9$   | $3.5 \pm 0.6$   | $1.4 \pm 0.2$   | $1.1 \pm 0.1$   |
| $\geq 4j$ , 1b, $p_T^{75}$ , $M_{T2}^{30}$          | $0.27 \pm 0.03$ | $0.14 \pm 0.02$ | $0.18 \pm 0.02$ | $1.2 \pm 0.2$   | $0.11 \pm 0.01$ |
| $\geq 4j$ , 1b, $p_T^{125}$ , $M_{T2}^0$            | $0.33 \pm 0.03$ | $0.14 \pm 0.01$ | $0.17 \pm 0.01$ | $0.81 \pm 0.13$ | $0.15 \pm 0.03$ |
| $\geq 4j$ , 1b, $p_T^{125}$ , $M_{T2}^{30}$         | $1.4 \pm 0.3$   | $0.65 \pm 0.12$ | $0.42 \pm 0.09$ | $0.76 \pm 0.12$ | $1.5 \pm 0.2$   |
| $\geq 4j$ , $\geq 2b$ , $p_T^0$ , $M_{T2}^0$        | $0.42 \pm 0.06$ | $0.18 \pm 0.03$ | $0.16 \pm 0.03$ | $1.4 \pm 0.1$   | $0.18 \pm 0.02$ |
| $\geq 4j$ , $\geq 2b$ , $p_T^0$ , $M_{T2}^{30}$     | $0.65 \pm 0.07$ | $0.26 \pm 0.03$ | $0.13 \pm 0.02$ | $0.86 \pm 0.08$ | $0.35 \pm 0.03$ |
| $\geq 4j$ , $\geq 2b$ , $p_T^{75}$ , $M_{T2}^0$     | $1.6 \pm 0.3$   | $0.67 \pm 0.11$ | $0.24 \pm 0.07$ | $0.71 \pm 0.08$ | $2.4 \pm 0.3$   |
| $\geq 4j$ , $\geq 2b$ , $p_T^{75}$ , $M_{T2}^{30}$  | $0.08 \pm 0.02$ | $0.03 \pm 0.00$ | $0.03 \pm 0.01$ | $0.73 \pm 0.07$ | $0.44 \pm 0.04$ |
| $\geq 4j$ , $\geq 2b$ , $p_T^{125}$ , $M_{T2}^0$    | $0.14 \pm 0.03$ | $0.05 \pm 0.02$ | $0.03 \pm 0.00$ | $0.53 \pm 0.06$ | $0.82 \pm 0.09$ |
| $\geq 4j$ , $\geq 2b$ , $p_T^{125}$ , $M_{T2}^{30}$ | $0.51 \pm 0.11$ | $0.20 \pm 0.06$ | $0.11 \pm 0.03$ | $0.57 \pm 0.05$ | $6.4 \pm 0.6$   |