Search for WH associated production with 5.3 fb^{-1} of Tevatron data: Additional Material

(Dated: July 21, 2010)

Additional material to compliment the 5.3 fb^{-1} search for WH associated production.

Preliminary Results for the ICHEP 2010 Conference

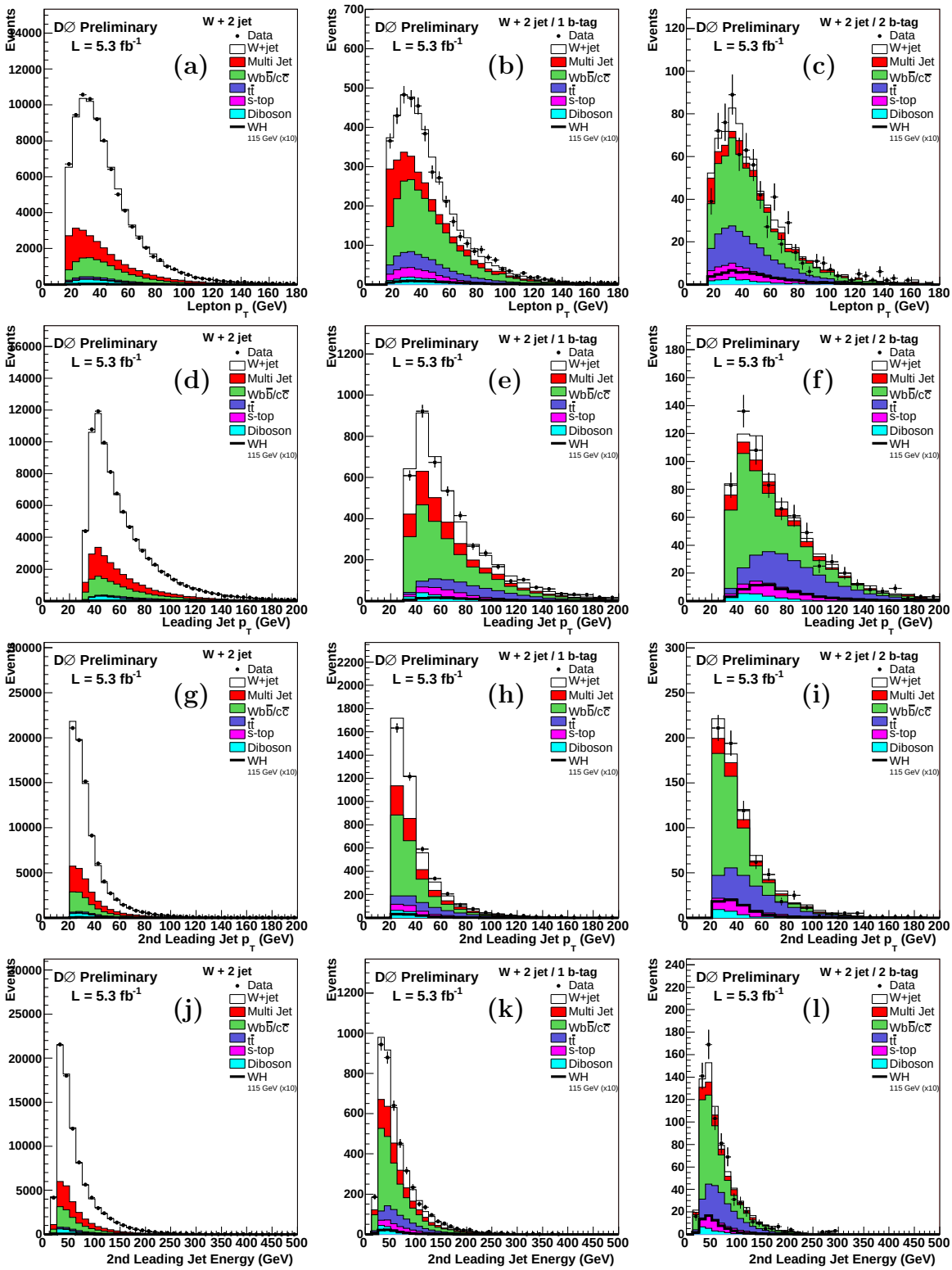

FIG. 1: Distribution in the W+2-jets sample of the observed (a-c) lepton p_T, (d-f) leading jet p_T, (g-i) 2nd leading jet p_T, and (j-l) 2nd leading jet energy in data compared to the simulated expectation. The left, center and right columns show pre-b-tagged, ST and DT data, respectively. The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized to the pre-b-tagged data.

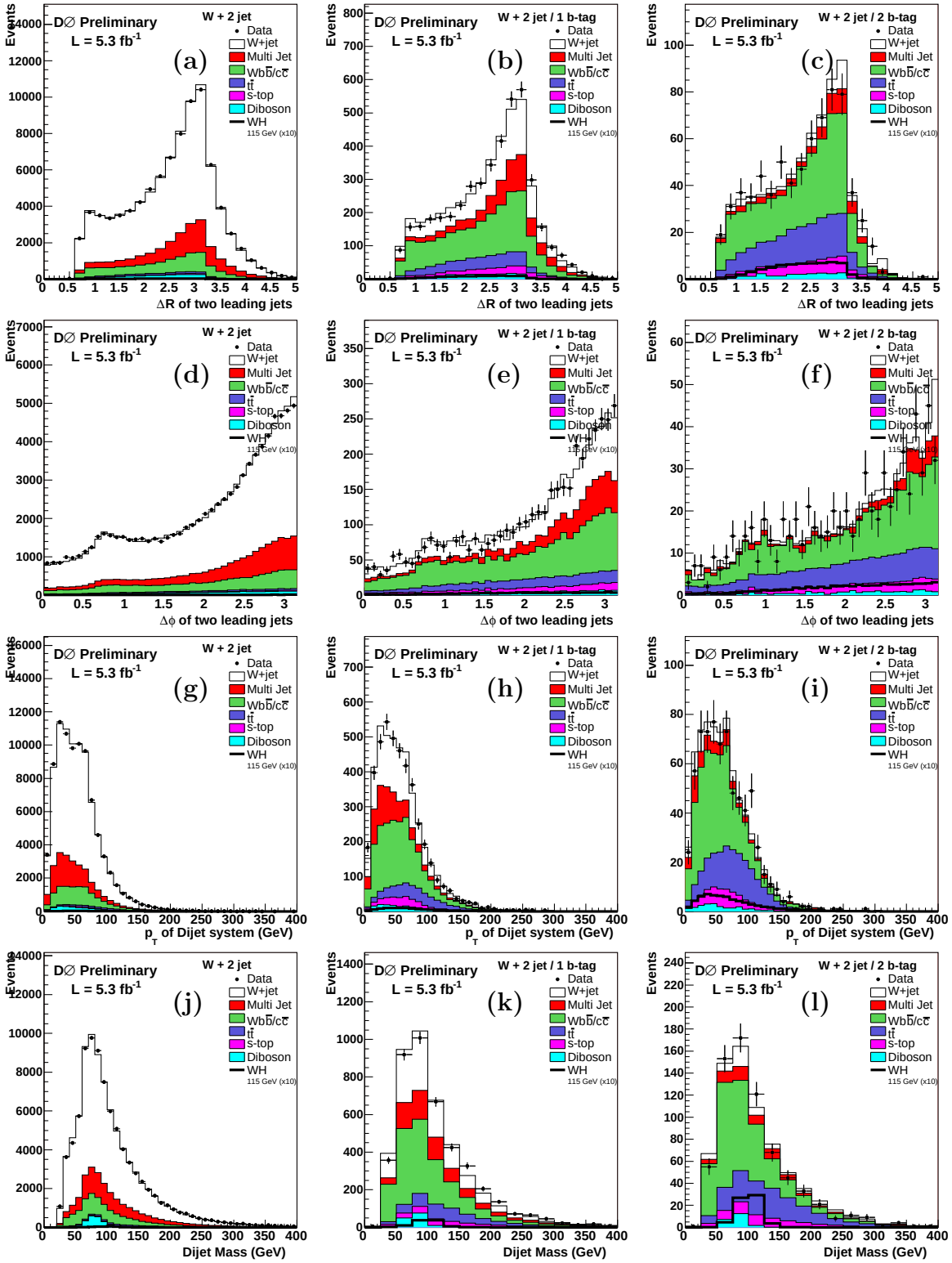

FIG. 2: Distribution in the W+2-jets sample of the observed (a-c) $\Delta\mathcal{R}$(two leading jets), (d-f) $\Delta\phi$(two leading jets), (g-i) p_T(dijet system), and (j-l) dijet invariant mass in data compared to the simulated expectation. The left, center and right columns show pre-b-tagged, ST and DT data, respectively. The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized to the pre-b-tagged data.

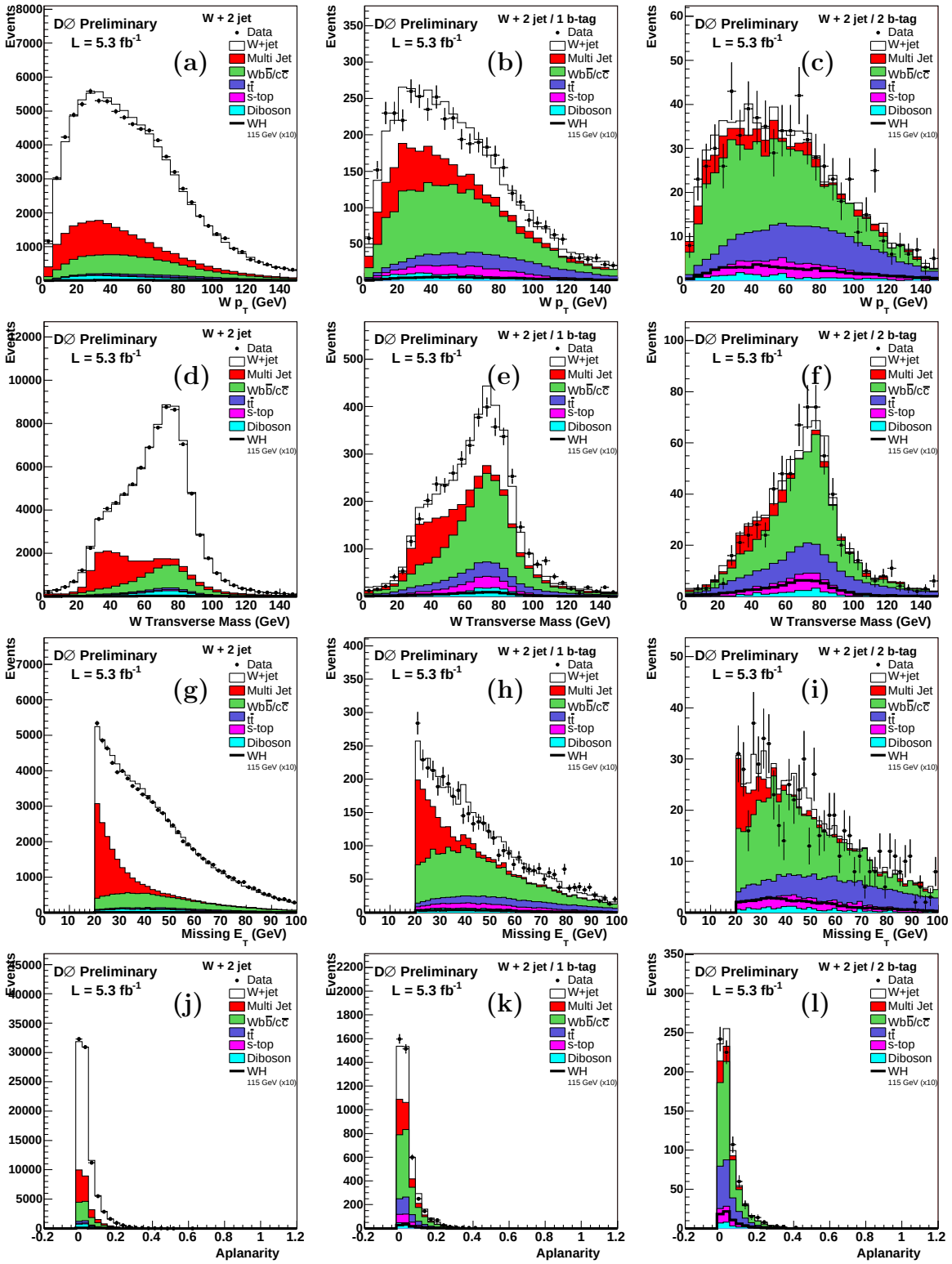

FIG. 3: Distribution in the W+2-jets sample of the observed (a-c) $p_T(\ell\text{-}\not\!\!E_T$ system), (d-f) transverse mass of $\ell\text{-}\not\!\!E_T$ system, (g-i) $\not\!\!E_T$, and (j-l) aplanarity in data compared to the simulated expectation. The left, center and right columns show pre-b-tagged, ST and DT data, respectively. The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized to the pre-b-tagged data.

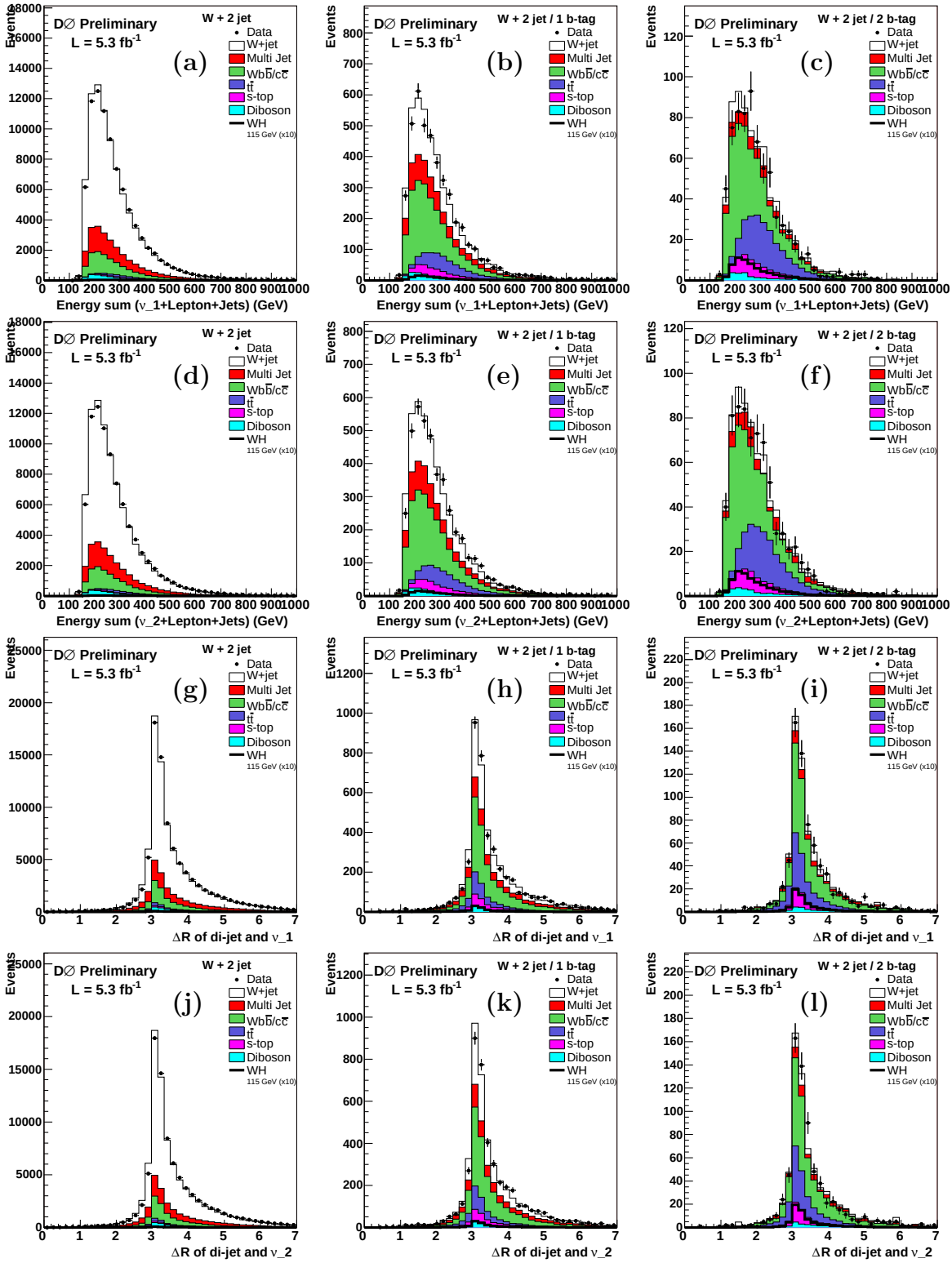

FIG. 4: Distribution in the W+2-jets sample of the observed (a-c) $\sqrt{\hat{s}}$ (ν p_Z solution 1), (d-f) $\sqrt{\hat{s}}$ (ν p_Z solution 2), (g-i) $\Delta\mathcal{R}$(dijet system, ℓ-ν system) (ν p_Z solution 1), and (j-l) $\Delta\mathcal{R}$(dijet system, ℓ-ν system) (ν p_Z solution 2) in data compared to the simulated expectation. The left, center and right columns show pre-b-tagged, ST and DT data, respectively. The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized to the pre-b-tagged data.

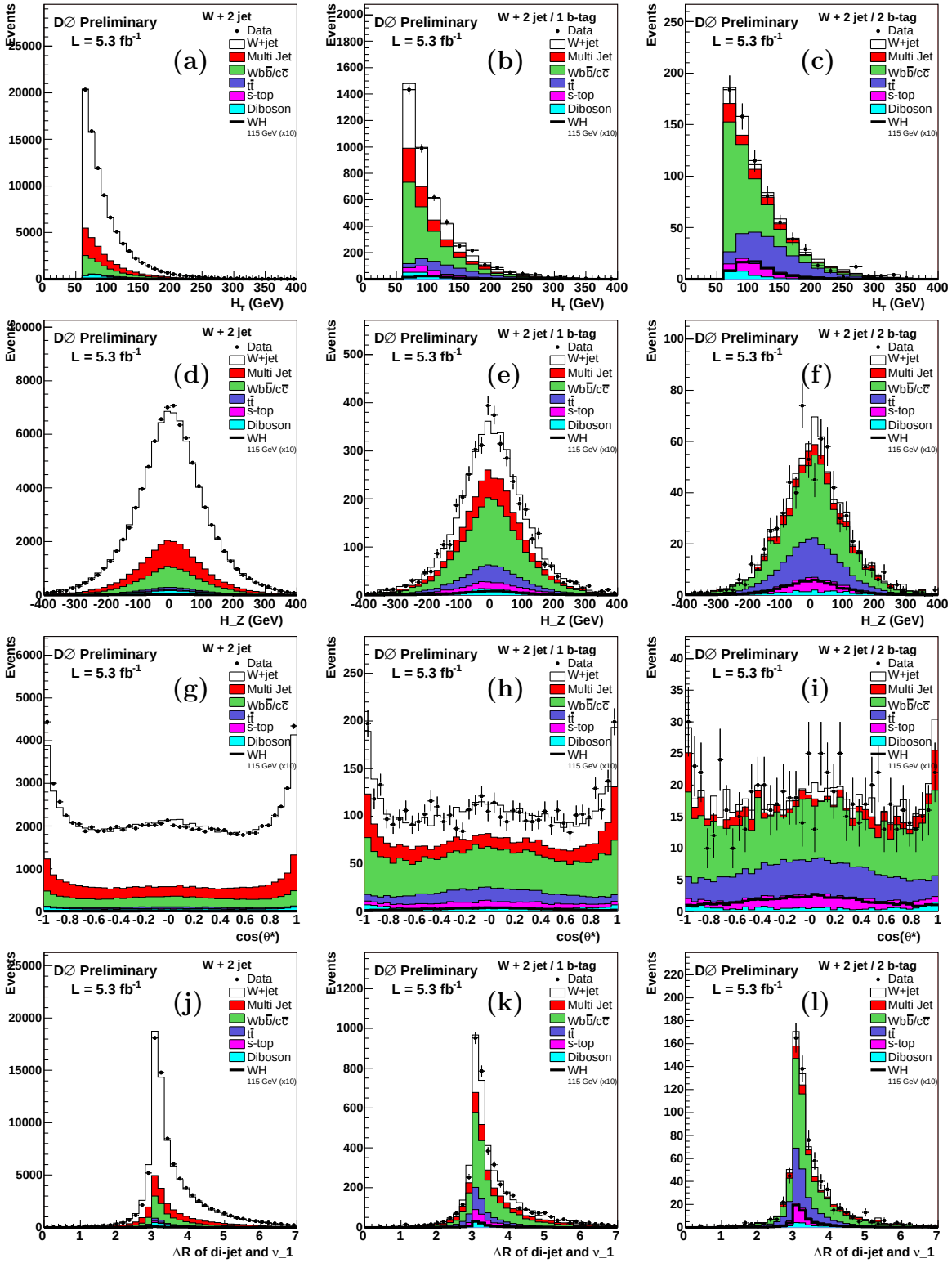

FIG. 5: Distribution in the W+2-jets sample of the observed (a-c) H_T, (d-f) H_Z, (g-i) $\cos\theta^*$, and (j-l) $\cos\chi$ in data compared to the simulated expectation. The left, center and right columns show pre-b-tagged, ST and DT data, respectively. The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized to the pre-b-tagged data.

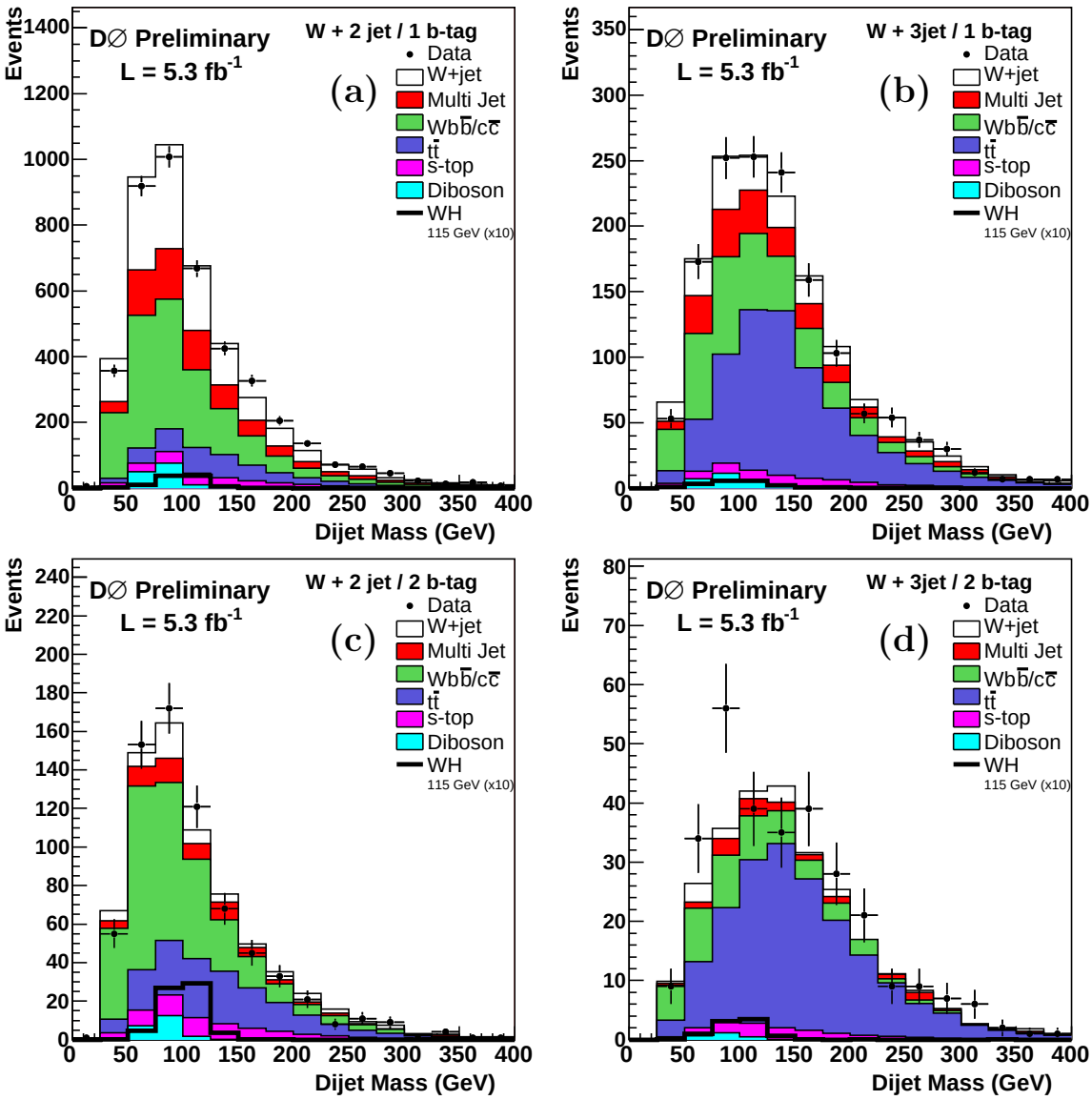

FIG. 6: a) (b) dijet invariant mass in W+2-(3-)jets events when exactly one jet is b-tagged. c) (d) same distributions when at least 2 jets are b-tagged. Linear scale. The simulated processes are normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the "untagged sample" to the data, taking into account all the other backgrounds. The backgrounds labelled as "other" in the figure are dominated by single-top production. Also shown is the contribution expected for standard model WH production with $m_H = 115$ GeV, multiplied by a factor 10.

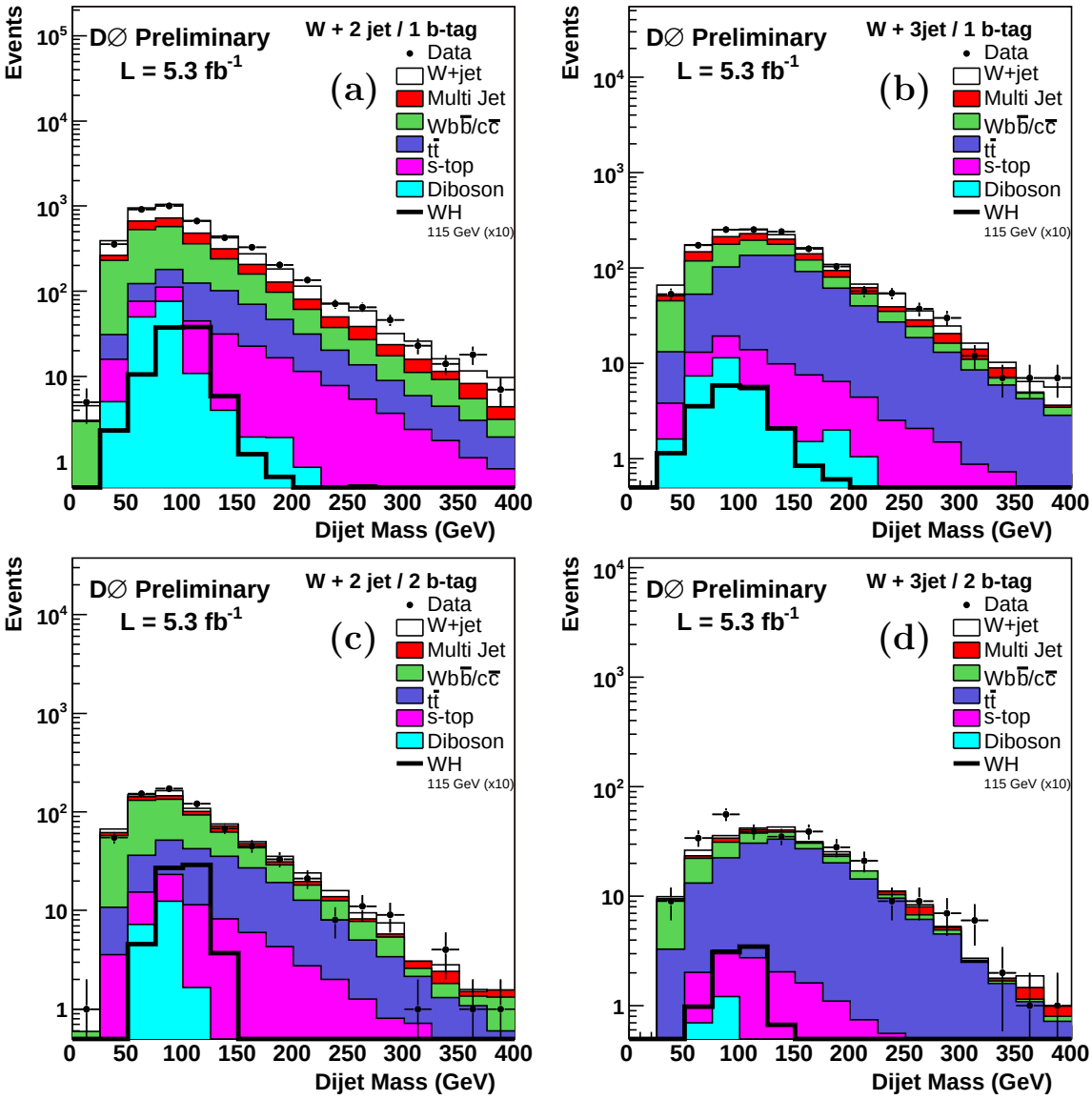

FIG. 7: a) (b) dijet invariant mass in W+2-(3-)jets events when exactly one jet is b-tagged. c) (d) same distributions when at least 2 jets are b-tagged. Logarithmic scale. The simulated processes are normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the "untagged sample" to the data, taking into account all the other backgrounds. The backgrounds labelled as "other" in the figure are dominated by single-top production. Also shown is the contribution expected for standard model WH production with $m_H = 115$ GeV, multiplied by a factor 10.

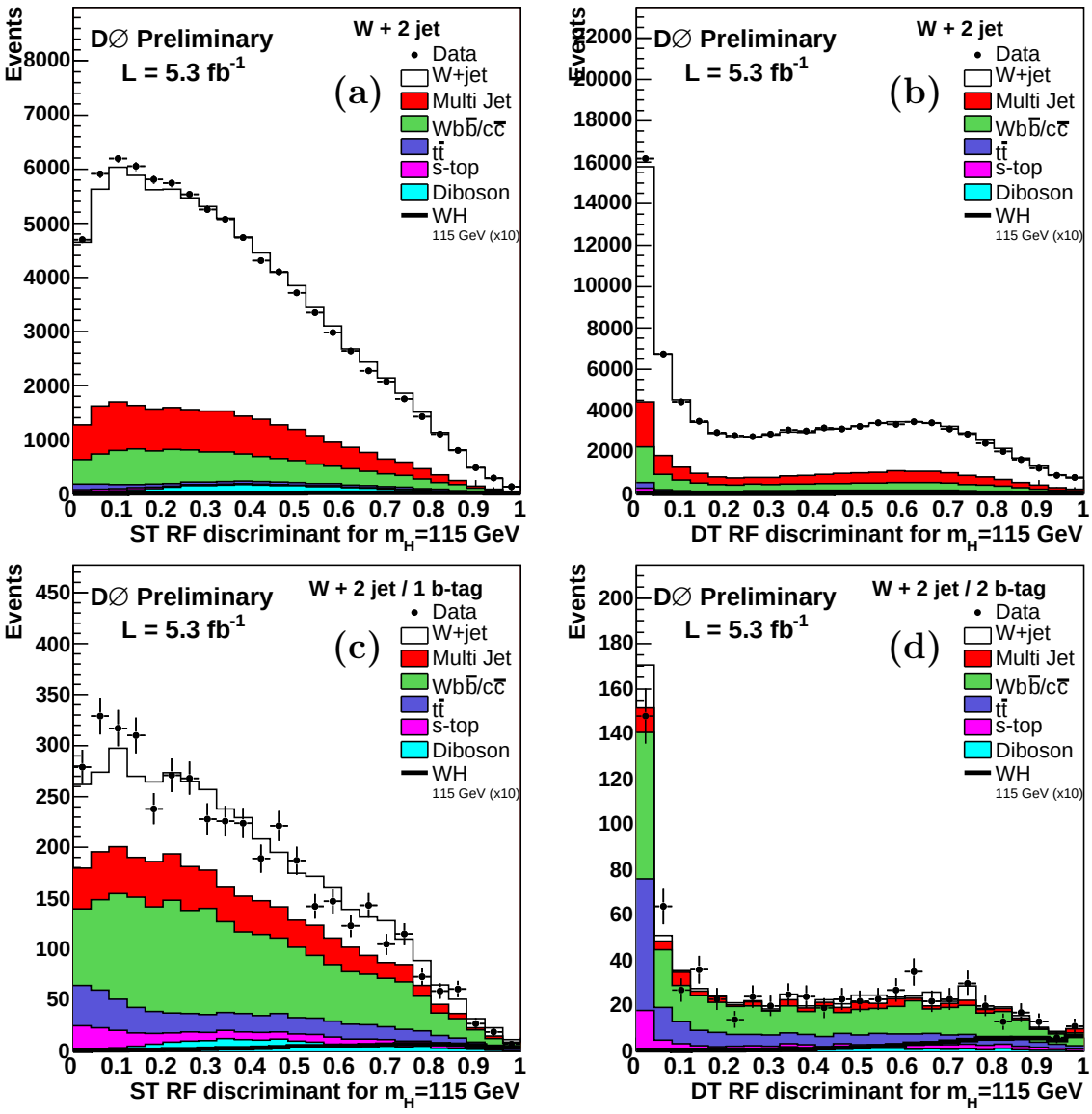

FIG. 8: Distributions (with linear vertical scale) of the W+2-jets RF output compared with the simulated expectation: a) before b-tagging for the ST RF ; b) before b-tagging for the DT RF ; c) in the single $b-$tag sample for the ST RF ; d) in the double $b-$tag sample for the DT RF ; The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the pre-b-tagged sample to the data, taking into account all the other backgrounds. The WH expected contribution for $m_H = 115$ GeV, multiplied by a factor 10, is peaking at high values of the RF output as shown in c) and d).

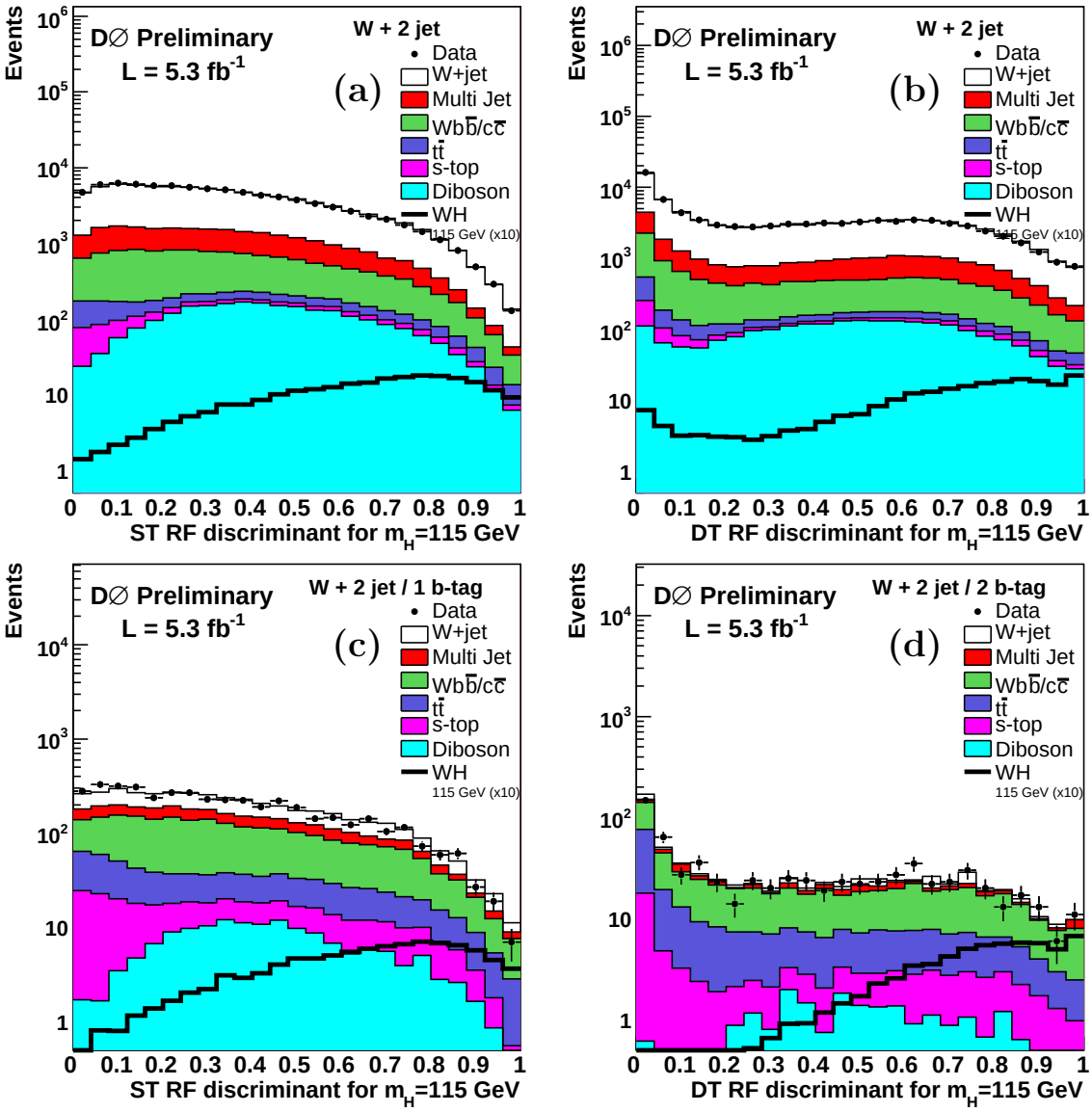

FIG. 9: Distributions (with logarithmic vertical scale) of the W+2-jets RF output compared with the simulated expectation: a) before b-tagging for the ST RF ; b) before b-tagging for the DT RF ; c) in the single $b-$tag sample for the ST RF ; d) in the double $b-$tag sample for the DT RF ; The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the pre-b-tagged sample to the data, taking into account all the other backgrounds. The WH expected contribution for $m_H = 115$ GeV, multiplied by a factor 10, is peaking at high values of the RF output as shown in c) and d).

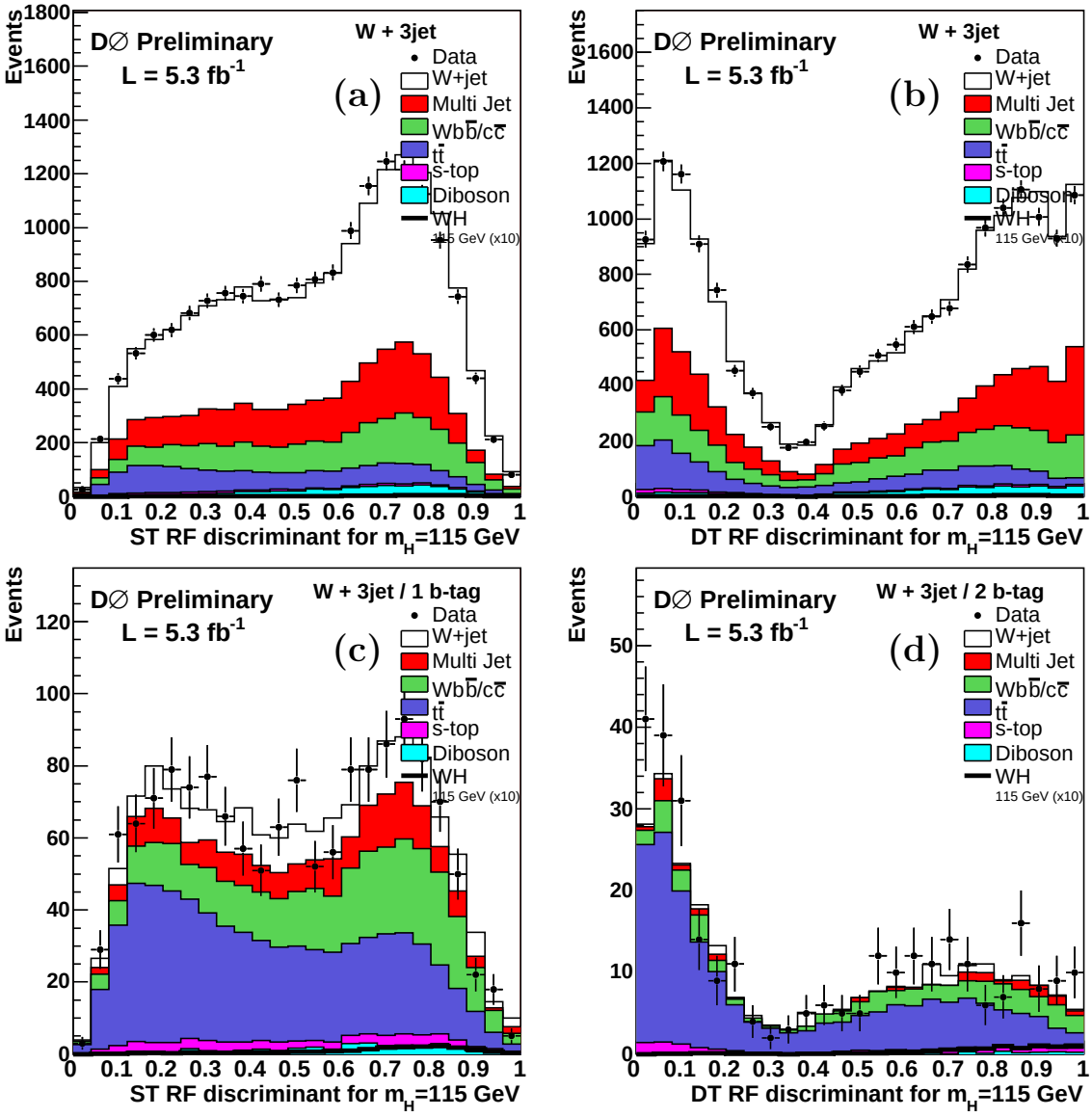

FIG. 10: Distributions (with linear vertical scale) of the W+3-jets RF output compared with the simulated expectation: a) before b-tagging for the ST RF ; b) before b-tagging for the DT RF ; c) in the single $b-$tag sample for the ST RF ; d) in the double $b-$tag sample for the DT RF ; The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the pre-b-tagged sample to the data, taking into account all the other backgrounds. The WH expected contribution for $m_H = 115$ GeV, multiplied by a factor 10, is peaking at high values of the RF output as shown in c) and d).

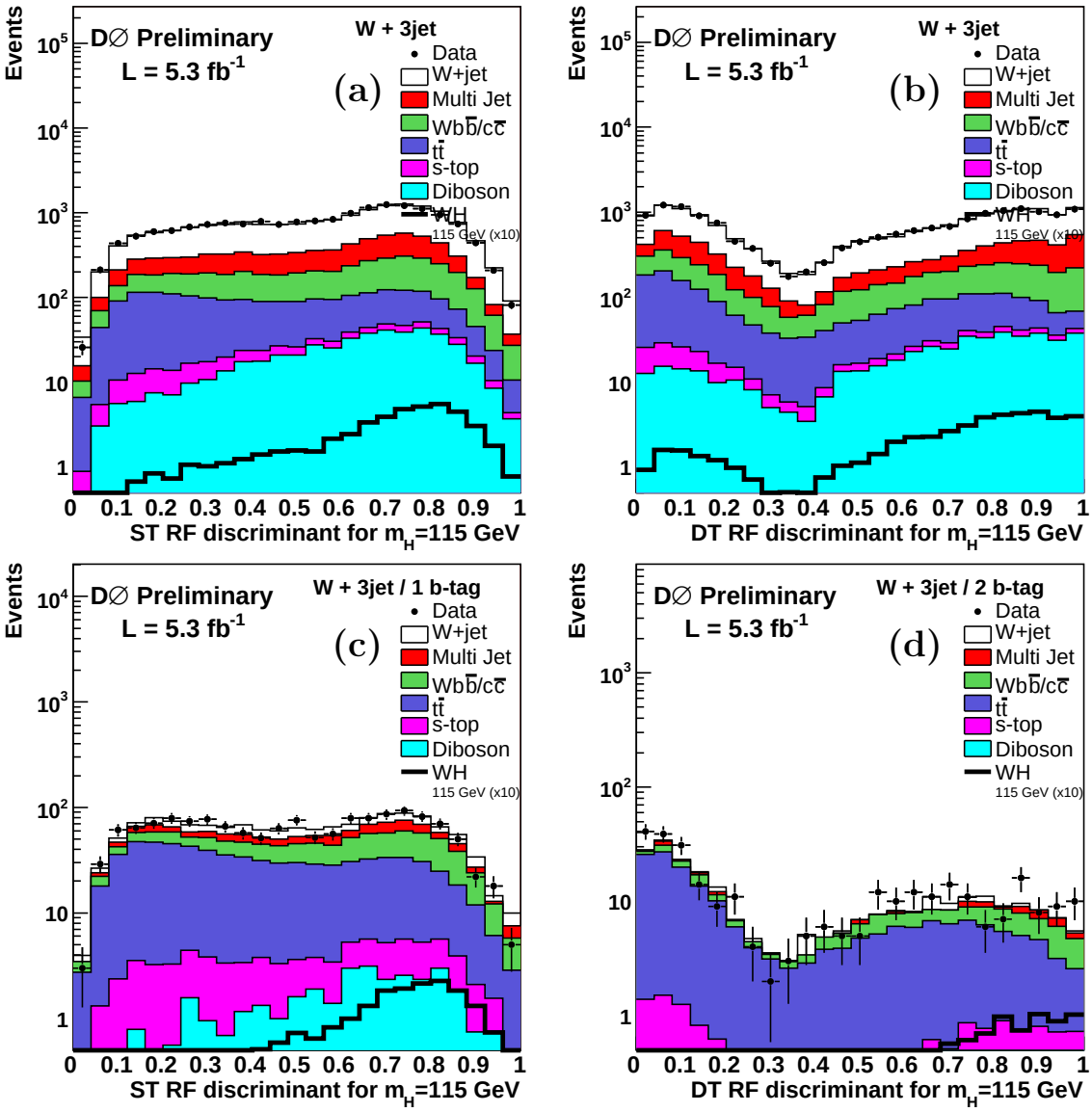

FIG. 11: Distributions (with logarithmic vertical scale) of the W+3-jets RF output compared with the simulated expectation: a) before b-tagging for the ST RF ; b) before b-tagging for the DT RF ; c) in the single $b-$tag sample for the ST RF ; d) in the double $b-$tag sample for the DT RF ; The simulation is normalized to the integrated luminosity of the data sample using the expected cross sections (absolute normalization) except for the W+jets sample which is normalized on the pre-b-tagged sample to the data, taking into account all the other backgrounds. The WH expected contribution for $m_H = 115$ GeV, multiplied by a factor 10, is peaking at high values of the RF output as shown in c) and d).