t-channel tH cross sections, kappa framework

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tH+\bar{t}H}$[fb]	$K_{\rm QCD}$	Scale+FS [%]	α_S [%]	PDF [%]	PDF+α_S [%]	σ_{tH}[fb]	$\sigma_{\bar{t}H}$[fb]
$k_t = 1$, $k_W = 1$	7	125.0	12.26	1.14	$+7.3$ -17.2	$+1.5$ -1.5	$+4.7$ -4.7	$+4.9$ -4.9	8.43	3.80
$k_t = 0$, $k_W = 1$	7	125.0	48.79	1.09						
$k_t = 1$, $k_W = 0$	7	125.0	37.99	0.95						

Table 1: Cross sections for t-channel tH and $\bar{t}H$ production at the 7 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tH+\bar{t}H}$[fb]	$K_{\rm QCD}$	Scale+FS [%]	α_S [%]	PDF [%]	PDF+α_S [%]	σ_{tH}[fb]	$\sigma_{\bar{t}H}$[fb]
$k_t = 1$, $k_W = 1$	8	125.0	18.69	1.15	$+7.3$ -16.5	$+1.4$ -1.4	$+4.4$ -4.4	$+4.6$ -4.6	12.73	5.95
$k_t = 0$, $k_W = 1$	8	125.0	72.62	1.10						
$k_t = 1$, $k_W = 0$	8	125.0	55.78	0.97						

Table 2: Cross sections for t-channel tH and $\bar{t}H$ production at the 8 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tH+\bar{t}H}$[fb]	$K_{\rm QCD}$	Scale+FS [%]	α_S [%]	PDF [%]	PDF+α_S [%]	σ_{tH}[fb]	$\sigma_{\bar{t}H}$[fb]
$k_t = 1$, $k_W = 1$	13	125.0	74.25	1.20	$+6.5$ -14.9	$+1.2$ -1.2	$+3.5$ -3.5	$+3.7$ -3.7	48.89	25.42
$k_t = 0$, $k_W = 1$	13	125.0	265.7	1.13	$+5.9$ -15.0	$+1.2$ -1.2	$+3.3$ -3.3	$+3.5$ -3.5	170.8	95.0
$k_t = 1$, $k_W = 0$	13	125.0	195.5	1.01	$+7.4$ -14.5	$+1.0$ -1.0	$+3.0$ -3.0	$+3.2$ -3.2	127.0	68.4

Table 3: Cross sections for t-channel tH and $\bar{t}H$ production at the 13 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tH+\bar{t}H}$[fb]	$K_{\rm QCD}$	Scale+FS [%]	α_S [%]	PDF [%]	PDF+α_S [%]	σ_{tH}[fb]	$\sigma_{\bar{t}H}$[fb]
$k_t = 1$, $k_W = 1$	14	125.0	90.10	1.20	$+6.4$ -14.7	$+1.2$ -1.2	$+3.4$ -3.4	$+3.6$ -3.6	59.07	31.12
$k_t = 0$, $k_W = 1$	14	125.0	318.8	1.14	$+5.8$ -14.9	$+1.1$ -1.1	$+3.2$ -3.2	$+3.4$ -3.4	203.7	114.8
$k_t = 1$, $k_W = 0$	14	125.0	232.6	1.01	$+7.4$ -14.1	$+1.0$ -1.0	$+2.9$ -2.9	$+3.1$ -3.1	150.4	82.1

Table 4: Cross sections for t-channel tH and $\bar{t}H$ production at the 14 TeV LHC in the kappa framework.

tWH cross sections, kappa framework

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tW^-H+\bar{t}W^+H}$[fb]	$K_{\rm QCD}$	Scale [%]	α_S [%]	PDF [%]	PDF+α_S [%]
$k_t = 1$, $k_W = 1$	7	125.0	2.23	0.99	$+4.2$ -5.5	$+2.0$ -2.0	$+8.2$ -8.2	$+8.4$ -8.4
$k_t = 0$, $k_W = 1$	7	125.0	3.784	1.06				
$k_t = 1$, $k_W = 0$	7	125.0	5.143	0.99				

Table 5: Cross sections for tWH production at the 7 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tW^-H+\bar{t}W^+H}$[fb]	$K_{\rm QCD}$	Scale [%]	α_S [%]	PDF [%]	PDF+α_S [%]
$k_t = 1$, $k_W = 1$	8	125.0	3.51	0.98	$+4.3$ -5.7	$+1.9$ -1.9	$+7.6$ -7.6	$+7.9$ -7.9
$k_t = 0$, $k_W = 1$	8	125.0	6.381	1.06				
$k_t = 1$, $k_W = 0$	8	125.0	8.515	0.99				

Table 6: Cross sections for tWH production at the 8 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tW^-H+\bar{t}W^+H}$[fb]	$K_{\rm QCD}$	Scale [%]	α_S [%]	PDF [%]	PDF+α_S [%]
$k_t = 1$, $k_W = 1$	13	125.0	15.17	0.94	$+4.9$ -6.7	$+1.5$ -1.5	$+6.1$ -6.1	$+6.3$ -6.3
$k_t = 0$, $k_W = 1$	13	125.0	35.05	1.05				
$k_t = 1$, $k_W = 0$	13	125.0	44.13	0.97				

Table 7: Cross sections for tWH production at the 13 TeV LHC in the kappa framework.

k_t, k_W	$\sqrt{s}$[TeV]	M_H[GeV]	$\sigma_{tW^-H+\bar{t}W^+H}$[fb]	$K_{\rm QCD}$	Scale [%]	α_S [%]	PDF [%]	PDF+α_S [%]
$k_t = 1$, $k_W = 1$	14	125.0	18.56	0.93	$+5.0$ -6.9	$+1.5$ -1.5	$+6.0$ -6.0	$+6.2$ -6.2
$k_t = 0$, $k_W = 1$	14	125.0	44.49	1.05				
$k_t = 1$, $k_W = 0$	14	125.0	55.46	0.97				

Table 8: Cross sections for tWH production at the 14 TeV LHC in the kappa framework.

Notes for tWH:

- $\sigma(tW^-H) = \sigma(\bar{t}W^+H) = \frac{1}{2}\sigma(tW^-H + \bar{t}W^+H)$;
- NLO results obtained with the DR2 technique (Diagram Removal plus interference) described in [1];
- reference scale $\mu_0 = (m_t + m_W + m_H)/2$;
- scale dependence from 7-point variations $(\frac{\mu_R}{\mu_0}, \frac{\mu_F}{\mu_0}) = (0.5, 0.5), (0.5, 1), (1, 0.5), (1, 1), (1, 2), (2, 1), (2, 2)$;
- same other inputs as in the computation of t-channel tH, see Section I.6.6.1.1 in [2].

References

[1] F. Demartin, B. Maier, F. Maltoni, K. Mawatari and M. Zaro, *tWH associated production at the LHC*, *Eur. Phys. J.* **C77** (2017) 34, [1607.05862].

[2] LHC HIGGS CROSS SECTION WORKING GROUP collaboration, D. de Florian et al., *Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector*, 1610.07922.